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THE CCTC QUICK-REACTING GENERAL WAR GAMING SYSTEM (QUICK). USER--ETC(U)

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IN REPLY
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1 March 1978

TO: RECIPIENTS

SUBJECT: Change 3 to Users Manual CSM UM 9-74, Volume IV, Sortie Generation Subsystem

1. Insert the enclosed change pages and destroy the replaced pages according to applicable security regulations.

2. A list of Effective Pages to verify the accuracy of this manual is enclosed. This list should be inserted before the title page.

3. When this change has been posted, make an entry in the Record of Changes.

FOR THE DIRECTOR

J. DOUGLAS POTTER
Assistant to the Director
for Administration

120 Enclosures
Change 3 pages

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EFFECTIVE PAGES - JUNE 1977

This list is used to verify the accuracy of CSM UM 9-74 Volume IV after change 3 pages have been inserted. Original pages are indicated by the letter O, change 1 pages by the numeral 1, change 2 pages by the numeral 2, etc.

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The computerized Quick-Reacting General War Gaming System (QUICK) will accept input data, automatically generated global strategic nuclear war plans, provide statistical output summaries, and produce input tapes to simulator subsystems external to QUICK.

The Users Manual consists of four volumes which are intended for the user/analyst who is concerned with preparing the data base for a war game, selecting optional features of QUICK, designating control parameters, submitting computer jobs, and analyzing computer output. This volume, Volume IV, provides detailed

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20. ABSTRACT (Continued).

instructions for execution of the Sortie Generation Subsystem and the modules it comprises.

The Users Manual complements the other QUICK Computer Manuals to facilitate application of the war gaming system. These manuals (Series 9-77 for Volumes I & II, Series 9-74 for Volumes III & IV) are published by the Command and Control Technical Center (CCTC), Defense Communications Agency (DCA), The Pentagon, Washington, DC 20301.

ABSTRACT

The computerized QUICK-Reacting General War Gaming System (QUICK) will accept input data, automatically generate global strategic nuclear war plans, provide statistical output summaries, and provide input tapes to simulator subsystems external to QUICK. QUICK has been programmed in FORTRAN for use on the CCTC HIS 6000 computer systems.

The QUICK Users Manual consists of four volumes: Volume I, Data Management Subsystem; Volume II, Weapon/Target Identification Subsystem; Volume III, Weapon Allocation Subsystem; Volume IV, Sortie Generation Subsystem. The Users Manual complements the other QUICK Computer System Manuals to facilitate application of the war gaming system. This volume, Volume IV, provides instructions for using the Sortie Generation subsystem. It is intended for the CCTC user/analyst who is concerned with preparing the data base for a war game, selecting optional features of the system, designating control parameters, submitting computer jobs, and analyzing computer output. Companion documents are:

a. MAINTENANCE MANUAL
   Program Maintenance Manual CSM MM 9-77, Volume I
   Program Maintenance Manual CSM MM 9-77, Volume II
   Program Maintenance Manual CSM MM 9-74, Volume III
   Program Maintenance Manual CSM MM 9-74, Volume IV
   Provides detailed instructions for maintenance of the system

b. TECHNICAL MEMORANDUM
   Technical Memorandum TM 153-77
   Provides a nontechnical description of the system for senior management personnel

SECTION 1. GENERAL

1.1 Purpose

This volume of the QUICK Users Manual is intended to inform the CCTC user/analyst on how to prepare control cards; structure execution (run) decks; prepare computer job requests; and understand the associated computer output, to include the recognition of error messages for the Sortie Generation subsystem of QUICK. It complements information contained in the Maintenance Manuals on the QUICK System. The abstract of this document references other documents describing QUICK.

1.2 General Description

The Sortie Generation subsystem operates using the output from the Weapon Allocation subsystem, and produces detailed bomber and missile (delivery vehicle and weapon) sortie specifications. Thus, it accepts a near-optimal weapon allocation, and from this as well as consideration of delivery vehicle characteristics and other factors, generates a detailed plan of attack for one opposing side in a hypothetical general war.

The subsystem consists of programs FOOTPRNT, POSTALOC, PLANOUT, and PLOTIT, as shown in figure 1. Figure 2 shows the relationship of the Sortie Generation subsystem to other QUICK subsystems in terms of procedural and information flow.

In addition to the plan generation requirements, per se, the output of this subsystem is utilized alternatively by:

a. Damage Assessment systems external to QUICK which utilize weapon/target strike data (DGZ tapes) as required

b. General War simulation models external to QUICK (e.g., NEMO and ESP) which utilize relevant strike data as required (DGZ, A/B tapes and TABLTAPE).

As shown in figure 3, the Sortie Generation subsystem is initiated when a spill tape from program ALOCOUT (Weapon Allocation subsystem) is received as input for processing by program FOOTPRNT.* Program FOOTPRNT reads the strike data from TMPALOC file. Information for bomber groups and for missile groups without a MIRV capability is copied directly to the ALOCGRP file, while the data for the missiles with MIRV payloads

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*FOOTPRNT is used if the plan includes MIRV system. The ALOCGRP file is then used in POSTALOC in place of the TMPALOC file.

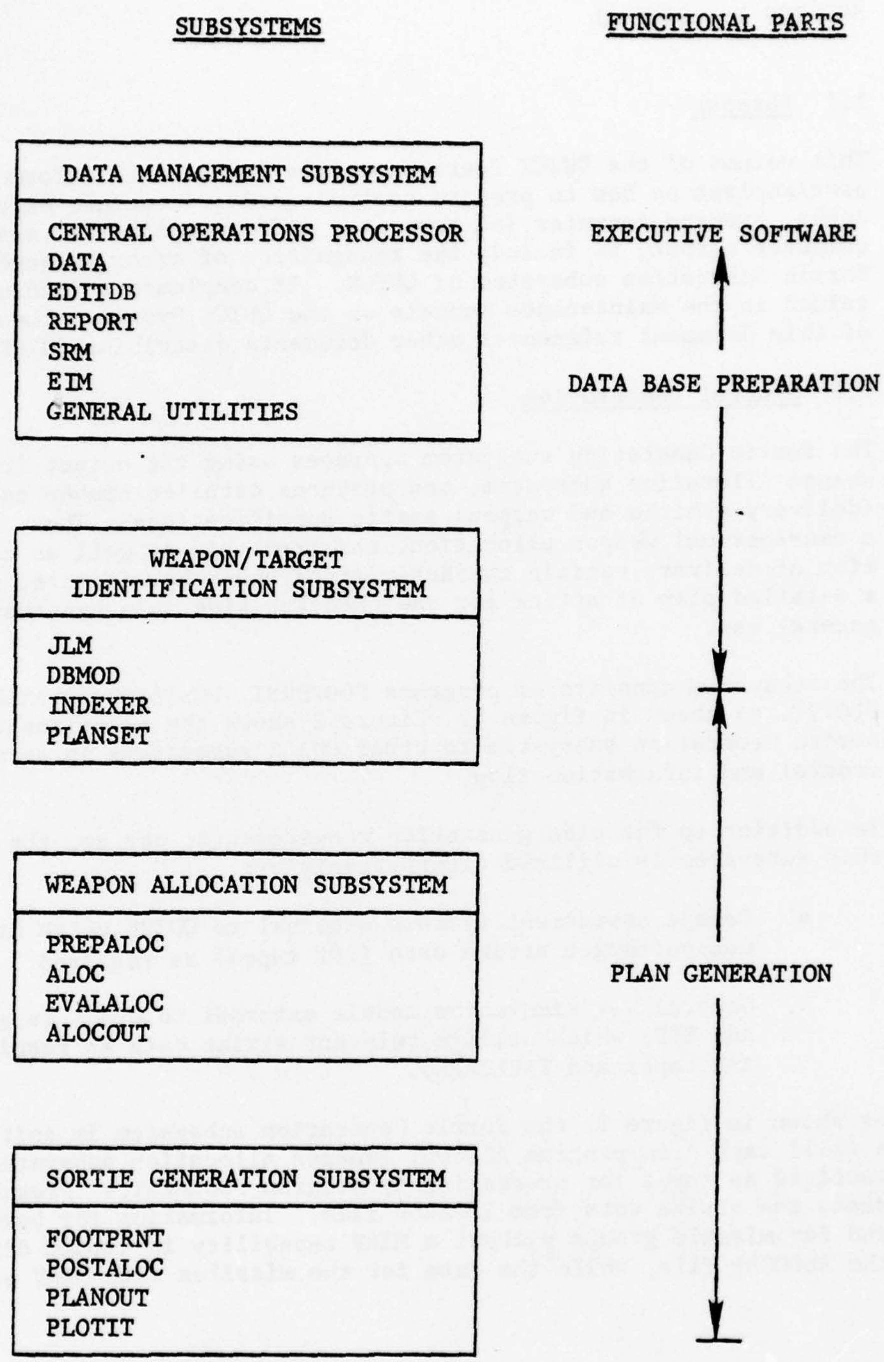

Figure 1. Major Subsystems of the QUICK System

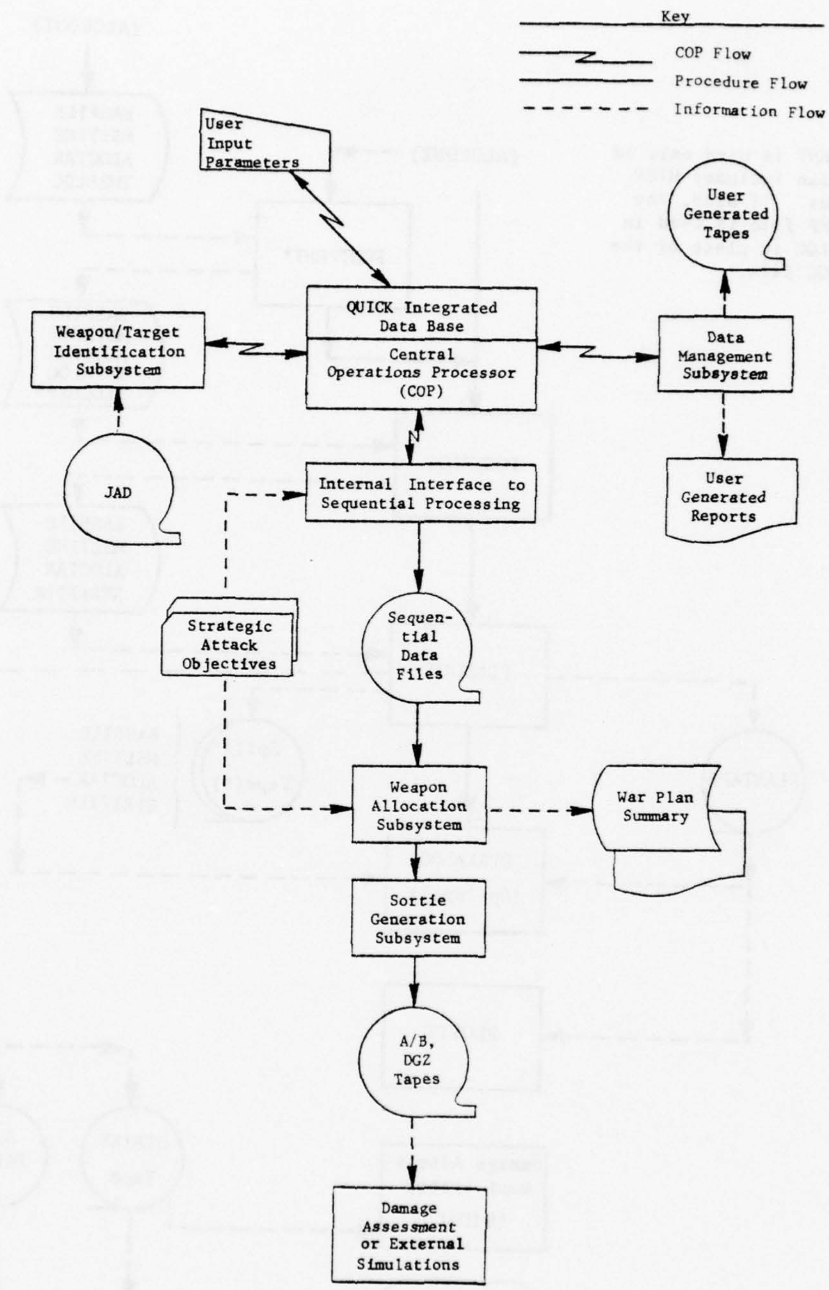

Figure 2. Procedure and Information Flow in QUICK/HIS 6000

*FOOTPRNT is used only if the plan includes MIRV systems. If used, the ALOCGRP file is used in POSTALOC in place of the TMPALOC file.

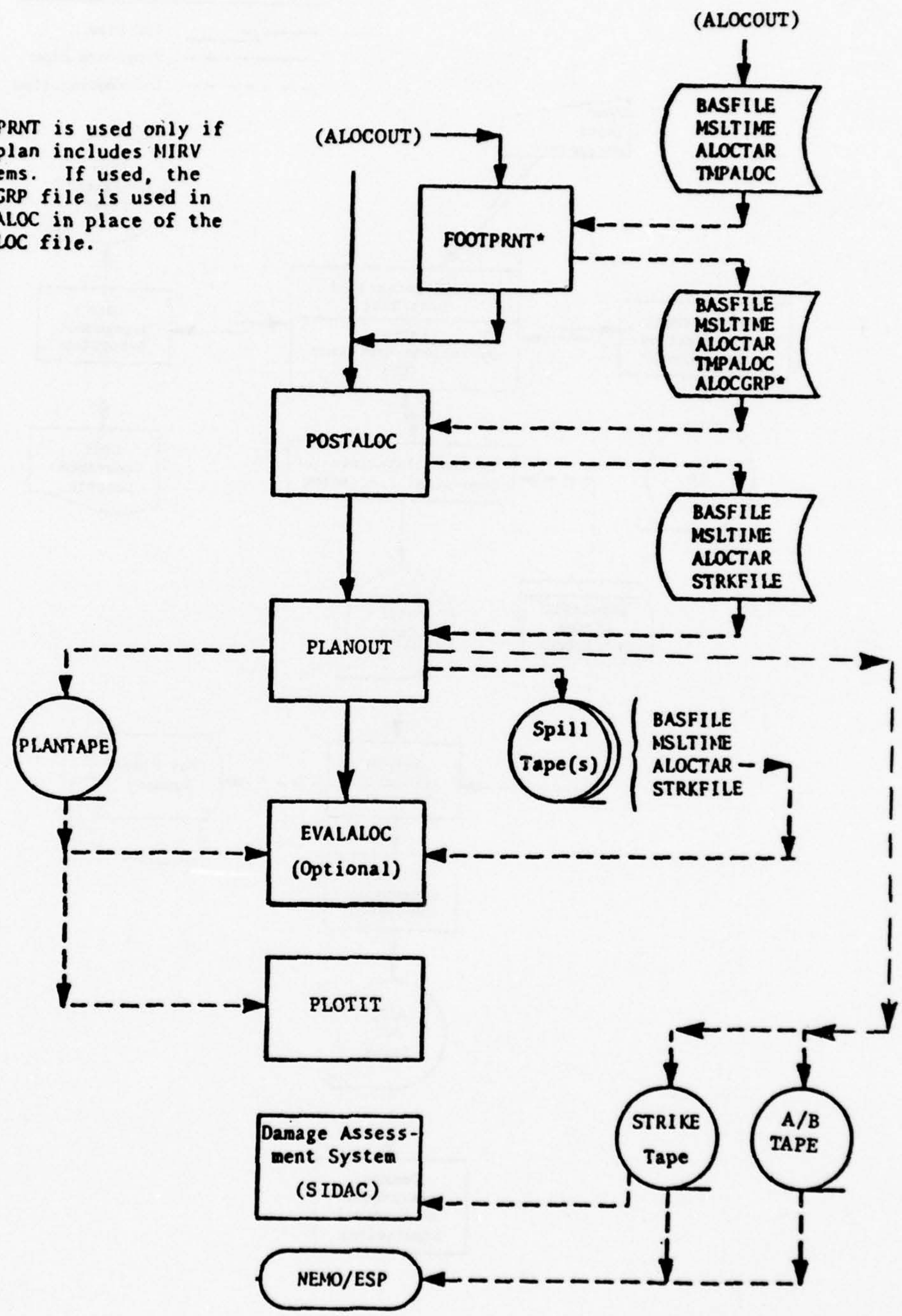

Figure 3. Sortie Generation Subsystem - Data Flow

are processed to create detailed reentry vehicle-target point assignments which satisfy the various constraints. These detailed assignments are then also written onto the ALOCGRP file.

POSTALOC then reads ALOCTAR one weapon group at a time to develop specific bomber and missile sorties. The missile launch events prepared by POSTALOC are output to the STRKFILE. The bomber sorties are prepared one corridor at a time for each group and output to the STRKFILE.

The sortie plans at this point are not fully detailed. Program PLANOUT therefore adds the required data, e.g., timing information, and creates two output tape files. The plan tape PLANTAPE contains detailed mission plans in a form suitable for review or use in program PLOTIT and EVALALOC.

Program PLOTIT uses the PLANTAPE tape generated from a QUICK data base to produce rectilinear plots of bomber or tanker sorties. Plots are produced for PIC-1 and PIC-2 maps, as well as, on the scales: 50 x 40 inches, 20 x 20 inches, or 10 x 10 inches. For plots other than PIC-1 and PIC-2 maps, the program will automatically choose the most desirable origin for the plots and will draw axes and table them accordingly. Up to 10 sorties may be plotted on one graph (or 200 events). The option is available to plot all sorties on the PLANTAPE or to plot only sorties specified on input cards.

1.3 Organization of Users Manual, Volume IV

The components of the Weapon Allocation subsystem are characterized in the following major sections on a program-by-program basis. In general, each major section of this manual is further subdivided into three principal subsections, which are: program file utilization, input, and output for each program. In addition, the appendix to this volume details the executable job control language (JCL) for running the programs of this subsystem. Outline descriptions of the content of program subsections follow.

1.3.1 Program File Utilization. This subsection details the input and output data files and how they are used in the given program.

1.3.2 Program Input. This subsection details the set-up of input data, with notated examples. Note that although attribute names are presented in eight characters in the examples, they must actually be unique in the first six characters. This is taken care of internally in the code.

1.3.3 Program Output. This subsection describes the scope and content of program output, with notated examples.

SECTION 2. PROGRAM FOOTPRNT

2.1 Purpose

The purpose of program FOOTPRNT is to generate individual reentry vehicle assignments for MIRV weapons. This is done by dividing the set of targets assigned to a MIRV group into subsets, each of which is assigned to one booster in the group. This division is constrained by the limitations of the MIRV systems so that the acceptable booster assignments lie within a geographic pattern known as a footprint.

2.2 Concept of Use

The program is divided into two modules, the test module and the assignment module. The test module receives as input a potential booster assignment. Using footprint constraint parameters supplied by the user, this module determines if the target set is a feasible footprint for the MIRV system.

The assignment module attempts to assign targets to a booster within booster loading constraints specified by the user.

This program receives the TMPALOC file from program ALOCOUT and prepares the ALOCGRP file. This latter file contains the weapon-target allocation ordered by weapon groups. Program FOOTPRNT processes only those groups with a MIRV capability. The target assignments to those groups are divided into subassignments, each of which is a feasible MIRV booster assignment.

There are two types of user input: print control and footprint assignment parameters. The first type controls prints of general interest to analysts. The second type, footprint assignment parameters, defines the nature of feasible footprints. These parameters define the fuel used in delivering a series of reentry vehicles and decoys in a specific geographic pattern. The required user-input parameters are a set of coefficients to equations used to model the physical MIRV systems.

If there are no vehicles with a MIRV capability in the plan being generated, program FOOTPRNT need not be run. It may be run in this case, however, but will have no effect on the plan generation process. If there are MIRV vehicles in the plan, program FOOTPRNT must be run before program POSTALOC.

2.3 File Utilization

Figure 4 displays the utilization of files by program FOOTPRNT.

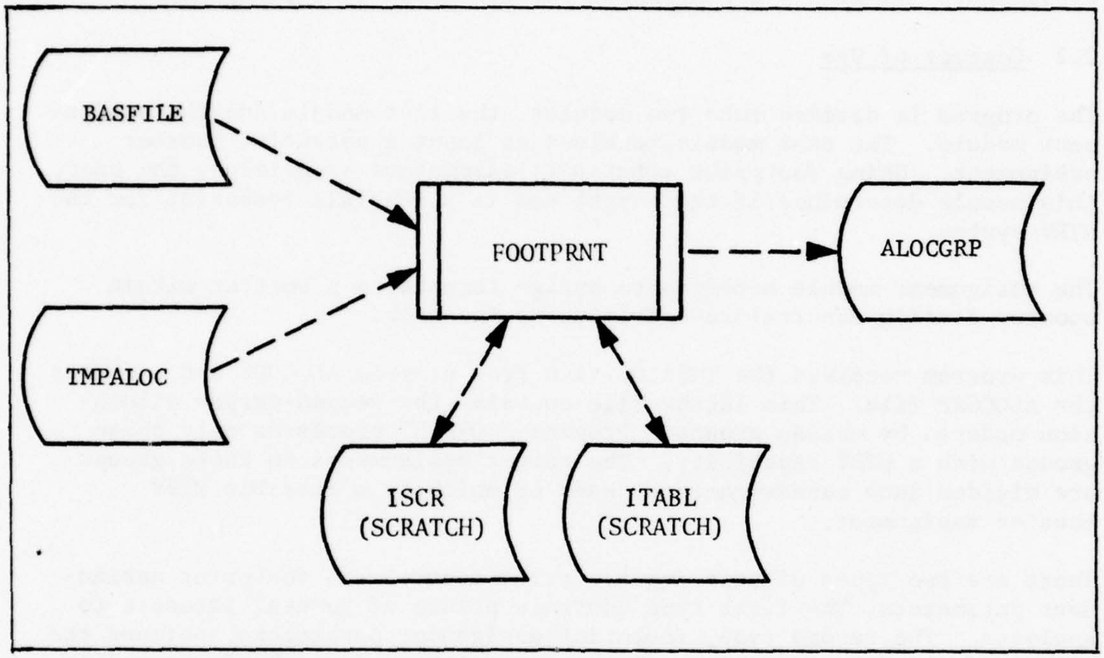

Figure 4. Program FOOTPRNT File Utilization

2.3.1 Input Files. The Base File (BASFILE) prepared by program PREPALOC, contains basic information defining weapon characteristics. Program FOOTPRNT extracts from this file data on the number of weapons in each group and the payload carried by each weapon type.

The Temporary Allocation File (TMPALOC) prepared by program ALOCOUT, contains the allocation of weapons to targets. The information is ordered by weapon group number and, within weapon groups, it is ordered by penetration corridor number.

2.3.2. Output Files. The Allocation-by-Group File (ALOCGRP), to be used by program POSTALOC, is identical to the TMPALOC file for those weapon groups without a MIRV capability. For MIRV groups, the data have been ordered and flagged to specify the assignment of weapons on each booster.

2.3.3 Scratch Files. The ISCR (Base Target Data) contains the basic target data read from the ALOCGRP file. It is placed on the ISCR file so that the core storage reserved for this information may be used for other purposes. A temporary assignment plan is also saved on this file.

The ITABL (User-Input Parameters) file is used for temporary storage of the user-input parameters which define the footprint constraint equations.

2.3.4 Filehandler Buffer Utilization. The filehandler buffer areas utilized by program FOOTPRNT are shown in figure 5.

FILE NAME	BUFFER NUMBER (LUN)
BASFILE	8
TMPALOC	3
ALOCGRP	2
ISCR	25 (Scratch)
ITABL	26 (Scratch)

Figure 5. Filehandler Buffer Utilization-Program FOOTPRNT

2.4 Input. There are two types of user input. One type is print control and the second type, footprint constraint information, is used in the footprint testing module of the program to determine the feasibility of candidate booster assignments.

2.4.1 Print Options. The user has the options of requesting non-standard prints for given weapon groups. These cards are the first ones read in by FOOTPRNT. There is one card per print request. A blank card ends the print requests. There must be one blank card even if no prints are requested. Format of each card is:

CARD COLUMNS	DESCRIPTION
1-10	The group number to be printed. A blank ends print cards
11-20	Non-zero if prints desired on a sweep basis =1, when targets are examined by increasing azimuth =2, decreasing azimuth
21-30	Non-zero for prints only on a given pass =1, fixed targets only =2, normal processing =3, with dumping
31-40	Non-zero for prints only for given targets. This entry defines the lower internal target index for which detail prints are desired
41-50	Used in combination with entry in card columns 21-40 and defines the higher target index to be printed.

Note that all entries are free form inputs; that is, entries may be placed anywhere within each 10-character field.

2.4.2 User Input Footprint Parameter Tables. The footprint parameter tables define the footprint constraints. Each footprint constraint is represented by a series of equations which model fuel supply and demand for each configuration of reentry vehicles and targets.

There are four types of systems modeled in program FOOTPRNT and are identified through parameter MTYPE (=1,2,3, or 4). MTYPE simply specifies the nature or form of equations that model each MIRV system.

User inputs supply constraints into equations whose form is obtained through a value for MTYPE. Each MIRV system is identified for program FOOTPRNT by the value of the attribute NAME. Each system is identified on input by a system title card requesting the appropriate footprint constraint formulae (through MTYPE). The reading of footprint data is terminated by a blank system title card. Each title card format is:

CARD COLUMN	DESCRIPTION
1-10	Hollerith name of the MIRV system
11-20	MTYPE (1,2,3, or 4)
21-30	Maximum number of RVs permitted on each booster

In any run of FOOTPRNT, up to 40 different kinds of MIRV systems may be played.

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2.4.3 User-Input Parameters: Footprint Parameter Tables. The format of the user-input parameters for the footprint parameter tables are explained in the following sections. Unless otherwise noted, the default value for each parameter is 0.0; justification within the data field is not applicable, and the decimal point should always be input in each field. These cards follow each system title card.

2.4.3.1 TYPE-1 System: MTYPE=1: This system can have a configuration of one to 16 RVs. Figure 8 displays the input format of the necessary data. Formats for cards 3 to 29 are F10.0, with one value per field and eight values per card. Each field is 10 columns wide starting with column 1. Successive values are ordered by ascending order of RVs. Thus, the first value is for one RV, the second value for two RVs, and the last value for 16 RVs. The system functions as follows:

a. Fuel load at booster separation: Constant for the initial configuration of RVs.

b. Maximum booster range: in nautical miles

RM = RBASIC + RADD * SINE(AZIMUTH)

RBASIC and RADD are functions of the sign of the azimuth

c. Range extension consumption: number of nautical miles traversed per unit of fuel

NM/FUEL = RX + RAXX * SINE(AZIMUTH)

RX and RAXX are functions of the sign of the azimuth

Card 1 -- Fuel Load at Booster Separation

Card	Columns	Name	Description
1	1-10	GAS	Pounds of fuel

Card 2 (columns 1-40) -- Maximum Booster Range

Card	Columns	Name	Description
2	1-10	RBASIC(1)	For negative launch azimuths
	11-20	RBASIC(2)	For positive launch azimuths
	21-30	RADD(1)	Additional, azimuth dependant, range for negative azimuths
	31-40	RADD(2)	Additional, azimuth dependant, range for positive azimuths

Card 2 (columns 41-80) -- Range Extension Consumption

Card	Columns	Name	Description
2	41-50	RX(1)	For negative launch azimuths
	51-60	RX(2)	For positive launch azimuths
	61-70	RAXX(1)	Additional, azimuth dependant, consumption for negative azimuths
	71-80	RAXX(2)	Additional, azimuth dependant, consumption for positive azimuths

Cards 3-14 -- Downrange/Crossrange Ratio (On Board RVs)

Card Number	Name	Description
3, 4	EONE	Exponential Constants
5, 6	ETWO	Exponential Constants
7, 8	CONE	For negative launch azimuths
9, 10	CONE	Same as Cards 7, 8 for positive launch azimuths
11, 12	CTWO	For negative launch azimuths, azimuth dependent
13, 14	CTWO	Same as Cards 11, 12 for positive launch azimuths

Figure 8. MTYPE=1, MIRV Data Format (Part 1 of 2)

Card Number	Name	Description
29, 30	CTWO	Same as Cards 27, 28 for positive launch azimuths

Cards 31-46 -- Downrange/Uprange Ratio (On Board RVs)

31, 32	UE1	Same as Cards	19, 20
33, 34	UE1	Same as Cards	21, 22
35, 36	UE2	Same as Cards	23, 24
37, 38	UE2	Same as Cards	25, 26
39, 40	UC1	Same as Cards	27, 28
41, 42	UC1	Same as Cards	29, 30
43, 44	UC2	Same as Cards	31, 32
45, 46	UC2	Same as Cards	33, 34

Cards 47-49 -- Denominators Used in the Toss Equations and the Downrange/Uprange and Downrange/Crossrange Ratio Equations

47, 48	TDENOM	Used in the Toss Equations for each number of RVs on board
49	UDEN	Used in the Downrange/Uprange ratio equation with the parameters on Cards 31-46
49	DENOM	Used in the Downrange/Crossrange ratio equations with the parameters on Cards 19-30

Note: Toss Equation parameter cards follow in groups based on the initial booster configuration. For example, if the initial configuration has four RVs on the booster, four cards are used to describe the configuration.

Card Number	Columns	Name	Description
50	1-2	N	The first configuration to be described where N is the initial booster load. If N=0, no configurations will follow. Assuming N=4, the following cards are:

Figure 8. (Part 2 of 3)

Cards 15-26 -- Downrange/Uprange Ratio (On Board RVs)

Card Number	Name		Description
15, 16	UE1	Same as Cards	3, 4
17, 18	UE2		5, 6
19, 20	UC1		3, 8
21, 22	UC1		9, 10
23, 24	UC2		11, 12
25, 26	UC2		13, 14

Cards 27-29 -- Denominators Used in the Toss Equations and the Downrange/Uprange and Downrange/Crossrange Ratio Equations

27, 28	TDENOM	Used in the Toss Equations for each number of RVs on board
29	UDEN	Used in the Downrange/Uprange ratio equation with the parameters on Cards 15-30
29	DENOM	Used in the Downrange/Crossrange ratio equations with the parameters on Cards 3-14

Cards 30-32 -- Toss Equation parameter cards follow in groups based on the the maximum booster configuration. For example, if the initial configuration has four RVs on the booster, three cards are used.

Card	Columns	Name	Description
30	1-10	TEONE	1 RV on board
	11-20	TETWO	
	21-30	TOSSC1	Negative launch azimuth, 1 RV on board
	31-40	TOSSC1	Positive launch azimuth, 1 RV on board
	41-50	TOSSC2	Azimuth dependent for negative launch azimuth, 1 RV on board
	51-60	TOSSC2	Azimuth dependent for positive launch azimuth, 1 RV on board
31	--	--	Same as Card 30 for 2 RVs on board
32	--	--	Same as Card 30 for 3 RVs on board

Figure 8. (Part 2 of 2)

d. Downrange/Crossrange Ratio:

$$DR/CR = G * (CONE + CTWO * SINE(AZIMUTH))$$

where

$$G = EXPF\left(EONE*\left(\frac{RM-R}{DENOM}\right)**ETWO\right)$$

CONE and CTWO are functions of the number of RVs currently on board and the sign of the azimuth.

EONE and ETWO are functions of the number of RVs currently on board.

DENOM is a constant.

e. Downrange/Uprange Ratio:

$$DR/UR = G * (UC1 + UC2 * SINE (AZIMUTH))$$

where

$$G = EXPF\left(UE1 * \left(\frac{RM-R}{UDEN}\right) **UE2\right)$$

UC1 and UC2 are functions of the number of RVs currently on board.

UE1 and UE2 are functions of the number of RVs currently on board.

UDEN is a constant.

f. RV toss equations: nautical miles per unit fuel

$$NM/FUEL = G * (TOSSC1 + TOSSC2 * SINE(AZIMUTH))$$

where

$$G = EXPF\left(TEONE*\left(\frac{RM-R}{TDENOM}\right)^{**TETWO}\right)$$

where

RM=maximum booster range
R =range to initial target

TOSSC1 and TOSSC2 are functions of number of RVs currently on board and sign of launch azimuth.

TEONE and TETWO are functions of number of RVs currently on board

TDENOM is a function of number of RVs currently on board.

2.4.3.2 TYPE-2 System: MTYPE=2. This system does not consider launch azimuth. It considers configurations containing from one to 16 RVs on board. Where R is the distance from the launch base to the initial target in the footprint, the system functions as follows:

a. RV Toss Fuel Consumption Equations:

$$\text{NM/Unit Fuel} = \text{ALPHA2} * R^2 + \text{ALPHA1} * R + \text{ALPHAZ}$$

The parameters are functions of the number of RVs currently on board.

b. Fuel Load at Booster Separation:

$$\text{TF} = \text{BETA2} * R^2 + \text{BETA1} * R + \text{BETAZ}$$

The parameters are constants.

c. Maximum Booster Range: This parameter, MAXRBOST, is a constant.

d. Downrange/Crossrange Ratio:

$$\text{DR/CR} = \text{GTWO} * R^2 + \text{GONE} * R + \text{GZERO}$$

These parameters are constant.

e. Downrange/Uprange Ratio:

$$\text{DR/UR} = \text{DONE} * R + \text{DZERO}$$

These parameters are constant.

Figure 9 displays the input format for this data set. All formats are F10.0. All formats for cards 1 to 6 are one value per field. Each field is 10 columns wide starting with column 1. The values are ordered by ascending order of RVs. The first value is for one RV, the second for two RVs, and the last for 16 RVs. There are eight values per card.

2.4.3.3 TYPE-3 System: MTYPE=3. This considers a long-range system with penetration aids similar to the Minuteman-III system. In the configuration for MTYPE=3, the booster will carry up to 16 reentry vehicles. In addition to the warheads, the payload contains chaff canisters for area penetration decoys.

The input data format for this type is very similar to that for the regular long-range system MTYPE=1. The only difference is in specification of the fuel load at booster separation. In place of the card

CARDS	DESCRIPTION
1	ALPHAZ (1-8)
2	ALPHAZ (9-16)
3,4	ALPHA1 (1-16)
5,6	ALPHA2 (1-16)

Card 7

COLUMN	DESCRIPTION
1-10	BETAZ
11-20	BETA1
21-30	BETA2
31-40	MAXRBOST

Card 8

COLUMN	DESCRIPTION
1-10	GTWO
11-20	GONE
21-30	GZERO
31-40	DONE
41-50	DZERO

Figure 9. MTYPE=2 MIRV Data Format

specifying the fuel on board (the first data card for MTYPE=1), the following card is used:

Columns	Name	Description
1-10	GAS	Total fuel load before subtration of spacing and release fuel
11-20	SRFDEN	Parameters for fuel cost equations
21-30	SRFC1	
31-40	SRFC2	
41-50	SRFEXP1	
51-60	SRFEXP2	

All formats are floating point (F10.0).

The spacing and release fuel, which is subtracted from the total fuel to determine the fuel available for footprinting, is computed as follows:

$$\text{Fuel} = G * (\text{SRFC1} + \text{SRFC2} * \text{SINE}(\text{AZIMUTH}))$$

where:

$$G = \text{EXPF}\left(\text{SRFEXP1}*\left(\frac{\text{RM-R}}{\text{SRFDEN}}\right)**\text{SRFEXP2}\right)$$

RM=maximum booster range
R =range to first target

2.4.3.4 Type-4 System: MTYPE=4: The Type-4 system can have one to 16 RVs as an initial launch configuration. Figure 9.1 displays the input format of the necessary data. All formats are floating point (F10.0) and like the inputs for MTYPE=1 there are eight values per card. The system functions are as follows:

a. RV Toss Fuel Consumption Equations:

$$\text{NM/Unit Fuel} = A2 * R^2 + A1 * R + A0$$

where:

A2, A1, and A0 are functions of the number of RVs currently on board and R is the range from the launch base to the initial target.

Cards 1-6 -- RV Toss Fuel Consumption Rates

Card Number	Name	Description
1, 2	A0	Fuel consumption rate parameters for all numbers of RVs currently on board
3, 4	A1	
5, 6	A2	

Card 7 (Columns 1-30) -- Fuel Load at Booster Separation

Columns	Name	Description
1-10	B0	Fuel load parameters
11-20	B1	
21-30	B2	

Card 7 (Columns 31-70) -- Maximum Booster Range

31-40	BRANGE(1)	Booster range for negative launch azimuths
41-50	BRANGE(2)	Booster range for positive launch azimuths
51-60	BRADD(1)	Additional range, dependent on azimuth, for negative azimuth
61-70	BRADD(2)	Additional range, dependent on azimuth, for positive azimuth

Card 8 (Columns 1-40) -- Downrange/Crossrange Ratio

1-10	CR2	Constants
11-20	CR1	
21-30	CRO	
31-40	CRDEN	

Card 8 (Columns 41-70) -- Downrange/Uprange Ratio

41-50	UD2	Constants
51-60	UD1	
61-70	UDO	

Figure 9.1. MTYPE=4 MIRV System Data Format

b. Fuel Load at Booster Separation:

$$TF = B2 * R^2 + B1 * R + B0$$

where:

B2, B1, and B0 are constants.

c. Maximum Booster Range:

$$RM = BRANGE + BRADD * SINE(AZIMUTH)$$

where:

BRANGE and BRADD are functions of the sign of the azimuth

d. Downrange/Crossrange Ratio:

$$DR/CR = C' + 1 - C'^{**(R*SINE(AZIMUTH)/CRDEN)}$$

for positive azimuths, and:

$$DR/CR = C' - 1 + C'^{**(-R*SINE(AZIMUTH)/CRDEN)}$$

for negative azimuths, where:

$$C' = CR2 * R^2 + CR1 * R + CR0$$

where:

CR2, CR1, CR0, and CRDEN are constants

e. Downrange/Uprange Ratio:

$$DR/UR = UD2 * R^2 + UD1 * R + UD0$$

where:

UD2, UD1, and UD0 are constants

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2.5 Output

2.5.1 Standard Prints. There are four standard reports produced by FOOTPRNT. These are:

- Group type input from BASFIL (figure 12)
- Footprint parameter tables (figure 13)
- Optional prints desired (figure 14)
- Status of footprint assignments (figure 15)

2.5.2 Non-Standard Prints. When user selected three separate non-standard prints are produced and are:

- Running status on assignments made (figure 16)
- Input target set (figure 17)
- Nature of target assignment summary (figure 18)

2.5.3 Error Messages. Figure 19 gives error messages that could be generated.

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① GROUP	② NWPNS	③ NO. VEHICLES	④ LATITUDE	⑤ LONGITUDE	⑥ CLASS	⑦ TYPE	⑧ IMIRV
1	366	72	46.11	89.30	2	B-52H	0
2	206	40	46.22	92.29	2	B-52H	0
3	44	8	47.20	119.20	2	B-52H	0
4	184	30	43.40	86.73	2	B-52G	0
5	135	24	41.85	97.55	2	B-52G	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
22	270	270	47.10	102.00	1	MM-IB	0
23	104	333	42.67	99.00	1	MM-II	1
24	250	74	44.00	98.50	1	MM-II	1

HEADING	LABEL	DESCRIPTION
①	GROUP	Group number
②	NWPNS	Number of weapons in group
③	NO. VEHICLES	Number of vehicles in group
④	LATITUDE	Latitude of group centroid
⑤	LONGITUDE	Longitude of group centroid
⑥	CLASS	Weapon class (ICLASS)
⑦	TYPE	Weapon type name
⑧	IMIRV	Value of attribute IMIRV from group; MIRV system identification number

Figure 12. Basic Weapon Information Print (Print Option 1)

```
                    1       2       3

        SYSTEM  SS-Z-3   MTYPE 2   3 REENTRY VEHICLES
     MAXIMUM BOOSTER RANGE
4  POSITIVE LAUNCH AZIMUTH  R = 5050.1 + 50.6*SINE(AZIMUTH)
5  NEGATIVE LAUNCH AZIMUTH  R = 5000.0 - 25.9*SINE(AZIMUTH)

   FUEL LOAD AT BOOSTER SEPARATION
6  BETATWO = 0.   BETAONE = -15.   BETAZERO = 250.

   FUEL CONSUMPTION PARAMETERS
   RVS   ALPHATWO   ALPHAONE   ALPHAZERO
7   1     5.1E-6     -3.0E-3    5.0 EO
    2     4.0E-6     -3.1E-3    6.1 EO
    3     3.9E-6     -3.0E-3    7.2 EO

8  DOWNRANGE/CROSSRANGE = C' + 1 -C'**(R*SINE(AZIMUTH)/5500.) FOR POSITIVE AZIMUTHS
   AND = C' -1 +1 -C'**(R-*SINE(AZIMUTH))/5500.) FOR NEGATIVE AZIMUTHS
   WHERE C' = 5.00E-6*X**2 -.4.230E-3*X*+5.000EO
9  DOWNRANGE/UPRANGE = 1.43E-6*X**2+1.00E-3*X+9.5EO

10 ELLIPSE   MAJOR   MINOR
      1      500.0   100.
      2      400.0    50.
      3      400.0   400.0
      4      290.0    50.0
      5       50.5   100.0
```

Figure 13. Footprint Parameter Table Print
(Part 1 of 2)

HEADING	LABEL	DESCRIPTION
1	SYSTEM	Name of the MIRV system
2	MTYPE	System type
3	REENTRY VEHICLES	Number of RVs for the system
4		Maximum booster range for Positive launch azimuth
5		Maximum booster range for Negative launch azimuth
6	FUEL LOAD	Amount of fuel on this bus as a function of range
7	FUEL CONSUMPTION	Parameter for the fuel consumption rate as a function of range for the number of RVs still on board
8	DOWNRANGE/CROSSRANGE	The equation to calculate the relative difficulty of going crossrange as opposed to downrange
9	DOWNRANGE/UPRANGE	The same as 8 but for going uprange
10	ELLIPSE	The semimajor and semiminor axes at maximum range for footprint collection.

Figure 13. (Part 2 of 2)

OPTIONAL PRINTS TURNED ON FORM

GROUP	SWEEP	PASS	INTERNAL INDICES FROM	INTERNAL INDICES TO
1	2	3	4	5
25				
32	1	2	112	114

HEADING	LABEL	DESCRIPTION
1	GROUP	The group number for the optional prints. If only the group is specified, only the group level prints will be produced.
2	SWEEP	=1, when targets are examined by increasing azimuth =2, when targets are examined by decreasing azimuth
3	PASS	Pass number for which prints are desired =1, fixed targets only =2, normal processing =3, with 1 RV dumped
4	FROM	Lower Internal Index of First Target for which detail prints are desired
5	TO	Higher Internal Index of First Target for which detail prints are desired

NOTE: 1 - 4 are necessary for Detailed Prints

Figure 14. User Print Request

1 2

FINAL PLAN FOR MM-II GROUP NO. 23

3 POSITIVE AZIMUTH SWEEP BETTER

4 95 OF 100 FIXED TARGETS HIT (95%)

5 180 OF 200 TARGETS HIT (90%)

6 19 OF 20 BOOSTERS USED (95%)

7 10 REENTRY VEHICLES DUMPED

BOOSTER 8 1 SALVO 3 9

	INDEXNO	LATITUDE	LONGITUDE	DLAT	DLONG	DESIG	TASK	CNTRYLOC	FLAG	RVAL	FIX	DUMP	INTERNAL INDEX	
10 1	11 2153	12 50.410	13 329.510	14 0.010	15 0.010	16 AB139	17 AB	18 UR	19 0	20 2.469.002	21	22 DUMPED	23 123	1 10
2	2153	50.410	329.510	0.010	0.010	AB139	AB	UR	0	2.469.002			123	2
3	2153	50.410	329.510	0.010	0.010	AB139	AB	UR	0	2.469.002	FIXED		124	3

INTERNAL INDEXES OF TARGETS NOT ASSIGNED TO A BOOSTER

24 5 14 15 16 20 25 51 52 53 54 55 56 57 191 194 196 197 198 199 200

HEADING	LABEL	DESCRIPTION
1	--	MIRV system name
2	GROUP NO.	Group Number
3	--	The sweep that produced the better assignment
4	--	The number of fixed targets that were hit, how many were allocated to the group and the percentage hit
5	--	The number of targets that were hit, how many were allocated and the percentage hit
6	--	The number of boosters used and how many were in the group
7	--	The number of times an extra RV was dumped on the First Target
8	BOOSTER	Booster number (in order of value of targets assigned)
9	SALVO	Salvo number (zero for non-salvoed missiles)
10	--	Order of delivery of reentry vehicles

Figure 15. Final Plan Print (Part 1 of 2)

HEADING	LABEL	DESCRIPTION
11	INDEXNO	Index number of target
12	LATITUDE	Latitude of target
13	LONGITUDE	Longitude of target
14	DLAT	Offset latitude of DGZ from target latitude
15	DLONG	Offset longitude of DGZ from target longitude
16	DESIG	Target designator code (DESIG)
17	TASK	Target task/subtask code (TASK)
18	CNTRYLOC	Target country location code (CNTRYLOC)
19	FLAG	Target flag code (FLAG)
20	RVAL	Target relative value (RVAL)
21	FIX	Fixed assignment indicator (FIXED for fixed assignment; blank otherwise)
22	DUMP	=DUMPED if an extra RV was dropped on this first target
23	INTERNAL INDEX	The internal index (see 24) of this target which was assigned to a booster
24	INTERNAL INDEXES	These are numbers, used internally by footprint, of the targets not assigned to any booster

Figure 15. (Part 2 of 2)

CUMULATIVE STATISTICS FOR GROUP 97 (10)

SWEEP	PASS	TARGETS HIT FIXED	ALL	DUMPED	BOOSTERS USED	SELECTION OPTIMAL	FAILURES PASS/BRANCH	LEAD TGTS NO ELLIPSES
1	1	17	50	0	10	12	15	5
1	2	20	125	0	23	16	20	9
1	3	25	140	1	25	25	21	2
2	1	16	40	0	10	46	22	5
2	2	16	95	0	22	79	30	0
2	3	17	135	7	25	105	30	2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

HEADING	LABEL	DESCRIPTION
1	SWEEP	The positive or negative sweep for statistics
2	PASS	The current pass for statistics
3	FIXED	The number of fixed targets hit
4	ALL	The number of targets hit
5	DUMPED	The number of RVs dumped on first targets
6	BOOSTERS	The number of boosters used so far in the sweep
7	OPTIMAL	The number of times the optimal solution was not feasible
8	PASS/BRANCH	The number of times a collection failed due to an excessive number of passes or branches in PATHFIND
9	LEAD TGTS NO ELLIPSES	The number of lead targets that were unable to fill any ellipse
10	GROUP	The group described by these statistics

Figure 16. Group Assignment Summary

```
 (1)            (2)
 JGROUP =       NT =
     (4)        (5)      (6)      (7)         (8)       (9)   (10)   (11)   (12)     (13)     (14)  (15)  (16)  (17)    (18)      (19)
(3)  INDEXNO  AZIMUTH  RANGE  LATITUDE  LONGITUDE  DLAT  DLONG  DESIG  TASK  CNTRYLOC  FLAG  RVAL  FIX  SALVO  BOOSTER  DEVELOPMENT (3)
```

HEADING	LABEL	DESCRIPTION
1	JGROUP	Weapon group number
2	NT	Number of targets (strikes) in this corridor
3	--	Internal order index
4	INDEXNO	Index number of target
5	AZIMUTH	Azimuth from group to target
6	RANGE	Range from group to target
7	LATITUDE	Target latitude
8	LONGITUDE	Target longitude
9	DLAT	Weapon offset latitude
10	DLONG	Weapon offset longitude
11	DESIG	Target designator code
12	TASK	Target task/subtask code
13	CNTRYLOC	Target country location code
14	FLAG	Target flag code
15	RVAL	Relative target value
16	FIX	Fixed assignment indicator: FIXED = fixed assignment; blank otherwise
17	SALVO	Salvo number (zero for non-salvoed weapons)
18	BOOSTER	Booster number the target is ultimately assigned to
19	DEVELOPMENT	Six flags indicating if this target has been hit at the end of each pass

Figure 17. Input Target Print
(Group Optional Print 2)

```
INTERNAL INDEX  125 (1)
 ELLIPSE (2) 1  (3) OPTIMAL SOLUTION FAILED
 ELLIPSE     2      TOO MANY PASSES/BRANCHES
 ELLIPSE     3      CHOSEN
```

HEADING	LABEL	DESCRIPTION
(1)	INTERNAL INDEX	The internal index number for the first target whose ellipses are being described
(2)	ELLIPSE	The Ellipse number
(3)	--	What happened with the ellipse after being passed to PATHFIND OPTIMAL 'OPTIMAL SOLUTION FAILED' - The best sequence could not meet fuel constraints 'TOO MANY PASSES/BRANCHES' - Due to the relative positions of the targets an inordinate amount of time and care being used to find a solution 'CHOSEN' - This ellipse was feasible

Figure 18. Results of Individual Target Processing

1 WRONG BASEFILE FORMAT REQUESTED XXXX GOT YYYY
A BASEFILE with incorrect format has been input to program FOOTPRNT. The job terminates without further processing. Rerun job using correct BASFILE.

2 TOO MANY FIXED ASSIGNMENTS
The user has assigned more weapons by the fixed assignment capability than actually exist in the weapon group. The program continues processing but will output a final plan containing the excess weapons. Rerun programs PREPALOC and/or ALOC, fixing fewer weapons from the current group.

3 GROUP XX HAS TOO MANY ASSIGNMENTS. NT = XX NBOOSTERS = XX
This message means the number of targets or boosters is too large for processing. This group is skipped and processing resumes on the next group. Consult a maintenance programmer.

4 THERE IS NO DATA FOR SYSTEM NO. XXXX
The downrange/crossrange subroutine or the downrange/uprange subroutine has received as an argument an MTYPE number for which there are no data. The value of the appropriate ratio is set equal to 1.E + 7 and processing continues.

Figure 19. FOOTPRNT Error Messages

SECTION 3. PROGRAM POSTALOC

3.1 Purpose

The purpose of program POSTALOC is the generation of detailed sortie specifications for bomber and missile vehicles, and their weapons, based on the near-optimal weapon allocation received from the Weapon Allocation subsystem, and consistent with user input weapon system specifications and operational constraints.

3.2 Concept of Use

The main operation performed in program POSTALOC is the expanding of the allocation that was developed in program ALOC into a plan of sufficient detail to serve as input for modules external to QUICK. For missiles, this is accomplished by specifying the coordinates of the launch point and the coordinates of the target. For bombers, the process is more complex. The first step in the development of a flight plan is the combining of several strikes into a single feasible sortie. In addition, with each sortie are associated a launch base and a recovery base. Also a flight profile is selected which specifies where in the flight plan low-altitude capability is to be utilized.

3.3 File Utilization

Two input files are required for the execution of program POSTALOC, and one output file is created by the program. Information on weapon payloads, penetration and depenetration corridors, and weapon groups is obtained from the BASFILE, while the list of strikes assigned to each weapon group is obtained from the TMPALOC or ALOCGRP file. The BASFILE is created in program PREPALOC, TMPALOC in program ALOCOUT, and ALOCGRP in program FOOTPRNT. The sole output from program POSTALOC is the STRKFILE, on which is contained the detailed specifications of sorties and missile launch events.

A diagram which depicts these files is presented in figure 35.

3.3.1 Input Files. The Base File (BASFILE), generated by program PREPALOC, contains data base information to be used throughout the plan generation process.

The Temporary Allocation File (TMPALOC) contains the weapon-target allocation ordered by weapon groups. Program ALOCOUT writes all of its results to this file.

The Allocation-by-Group File (ALOCGRP) represents FOOTPRNT's modifications of the MIRV information in TMPALOC when program FOOTPRNT is executed.

3.3.2 Output Files. The Strike File (STRKFILE) contains specific bomber and missile plans for input to program PLNTPLAN.

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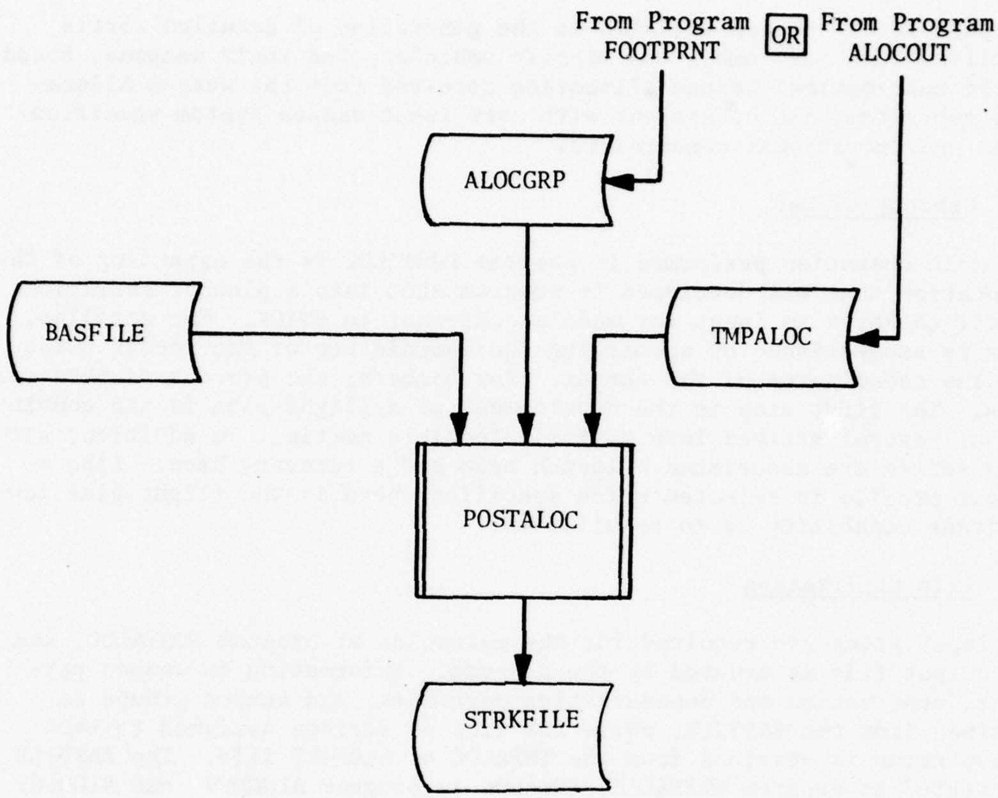


Figure 35. Program POSTALOC File Utilization

3.3.3 Filehandler Buffer Utilization. The above files use the filehandler buffers shown in figure 36.

FILE NAME	BUFFER NUMBER
BASFILE	8
TMPALOC	3
ALOCGRP	2
STRKFILE	15

Figure 36. Filehandler Buffer Utilization-Program POSTALOC

3.4 Input

The required input for program POSTALOC is of three types: the print options to be exercised for the run; values for certain parameters and user options to be used during the run; and special debug print options. A further description of these input parameters, together with illustrations of exemplar data cards, follows.

3.4.1 User-Input Parameters: Print Option Cards. There are 33 separate prints available to the user in program POSTALOC. Many of these prints, however, may be issued at more than one place in the sequence of program execution.

The print request numbers to be specified by the user indicate both the pring required and the point during processing at which that print is to be output. For example, print 1 displays the contents of common /SORTYTGT/. If that print is to be output during subroutine REFABORT, the user specifies print request number 140. If it is to be output during subroutine EVALB, it is effected by print request numbers 103, 104, 105, 106, 107, or 108; the one to be chosen depends on at what point within this subroutine the print is to be issued. For normal execution, only the standard prints are required. The others are available for the programmer, who will select prints based on analysis of the program listing. A list of these print request numbers is given in table 3.

There are only four prints which are normally of use to other than QUICK system programmers. These are:

a. Standard Print: Print request 75, the corridor summary of sorties, warheads, and recoveries. (This is print option 25 from subroutine OPTRAID.)

Table 3. Print Numbers Corresponding To Each Print Option (Part 1 of 6)

PRINT OPTION	PRINT REQUEST NUMBER	OCCURRENCE (SUBROUTINE)
1	31	SORTOPT
(contents of /SORTYTGT/)	85	INPOTGT
	101	SORTOPT
	102	SORTOPT
	103	EVALB
	104	EVALB
	105	EVALB
	106	EVALB
	107	EVALB
	108	EVALB
2	32	SORTOPT
(contents of /CURSORTY/)	70	CHGPLAN
	72	DUMPSRT
	80	GETSORT
	81	GETSORT
	89	SORTOPT
	90	CHGPLAN
	91	SORTOPT
	101	SORTOPT
	102	SORTOPT
	103	EVALB
	104	EVALB
	105	EVALB
	106	EVALB
	107	EVALB
	108	EVALB
3	19	FLTROUTE
(contents of /CURRAID/)	33	SORTOPT
	73	DUMPSRT
	84	TGTASGN
	132	GETSORT
	151	REFABORT
	153	FLTROUTE
	163	TGTASGN
	164	TGTASGN

PRINT OPTION	PRINT REQUEST NUMBER	OCCURRENCE (SUBROUTINE)
	165	TGTASGN
	166	TGTASGN
	167	TGTASGN
4	13	GENRAID
(contents of /RAIDSTRK/, and /CORPARM/)	20	FLTROUTE
	23	OPTRAID
	24	OPTRAID
	135	OPTRAID
	136	OPTRAID
	137	OPTRAID
	138	OPTRAID
	139	OPTRAID
	142	REFABORT
	143	REFABORT
	144	REFABORT
	145	REFABORT
	146	SORTOPT
	147	SORTOPT
	148	SORTOPT
	149	SORTOPT
	150	SORTOPT, GENRAID
	163	TGTASGN
	164	TGTASGN
	165	TGTASGN
	166	TGTASGN
	167	TGTASGN
	168	TGTASGN
5	55	EVALB
(contents of /EVAL/)	59	EVALOA
	67	EVALOB
	92	EVALB
6	9	GENRAID
(contents of /RAIDSHR/)	83	FLTROUTE
	87	GENRAID
	162	INITOPT
7	69	CHGPLAN
(contents of /CHGPLAN/)		

Table 3. (Part 3 of 6)

PRINT OPTION	PRINT REQUEST NUMBER	OCCURRENCE (SUBROUTINE)
8 (contents of /INITOPT/)	26	INITOPT
	77	FLTPLAN
	154	GETSORT
9 (contents of /INDEX/)	78	GETSORT
10 (contents of /TGTASGN/)	14	TGTASGN
	151	FLTROUTE
	153	FLTROUTE
	163	TGTASGN
	164	TGTASGN
	165	TGTASGN
	166	TGTASGN
	167	TGTASGN
11 (contents of /GRPTYPE/)	6	GETGROUP
12 (contents of /GRPDATA/)	5	GETGROUP
	88	GENRAID
	150	GENRAID
	161	INITOPT
13 (contents of /CORRCHAR/)	3	GETGROUP
14 (contents of /STRKSUM/)	8	PRERAID
15 (contents of /RAIDSHR/)	Not Active	
16 (contents of /CORRIDOR/)	11	GENRAID
	154	GETSORT
17 (contents of /NEXTFLT/)	18	FLTROUTE
	82	NEXTFLT
	152	FLTROUTE

Table 3. (Part 4 of 6)

PRINT OPTION	PRINT REQUEST NUMBER	OCCURRENCE (SUBROUTINE)
18	2	GETGROUP
(contents of /DEBUG/)	7	PRERAID
	10	GENRAID
	12	TGTASGN
	16	CORRPARM
	17	FLTROUTE
	21	NEXTFLT
	22	OPTRAID
	25	INITOPT
	30	SORTOPT
	34	FLTPLAN
	53	EVALB
	56	EVALOA
	60	EVALOB
	68	CHGPLAN
	71	DUMPSRT
	74	OUTSRT
	77	GETSORT
	95	FLTPLAN
19	Not Active	
20 (contents of /OUTSRT/)	76	OUTSRT
21 (contents of PAYLOAD/)	113	GETGROUP
22 (missile event data)	121	MISASGN
23	36	FLTPLAN
(parameters for a target in the hit list)	42	FLTPLAN
	51	FLTPLAN
24 (current sortie identification)	120	GETSORT

Table 3. (Part 5 of 6)

PRINT OPTION	PRINT REQUEST NUMBER	OCCURRENCE (SUBROUTINE)
25 (corridor summary)	75	OPTRAID
26 (characteristics of targets in the hit list)	35	FLTPLAN
	37	FLTPLAN
	50	FLTPLAN
	52	FLTPLAN
	96	FLTPLAN
27 (characteristics of targets considered for omission)	66	EVALOB
28 (target characteristics)	61	EVALOB
	62	EVALOB
	63	EVALOB
	64	EVALOB
	65	EVALOB
29 (ASM characteristics)	54	EVALB
	57	EVALOA
	58	EVALOA
	79	EVALOA
	93	EVALB
	94	EVALB
30 (low-altitude allocation)	47	FLTPLAN
	48	FLTPLAN
	49	FLTPLAN
31 (attrition rates)	44	FLTPLAN
32 (precorridor leg characteristics)	45	FLTPLAN
	46	FLTPLAN

SECTION 4. PROGRAM PLANOUT

4.1 General Description

Program PLANOUT's sole function is the execution of three separate overlays each of which may be viewed as distinct subroutines. This consolidation was made since, in general, the use of any one overlay results in all three being used.

The first overlay, PLANO1, permits the user to make minor changes to the plans generated by QUICK but not requiring a new allocation. PLANO1 gives the user control over targets assigned to a specific sortie, the weapon offsets, time of delivery, and height of burst. The user may change plans generated by POSTALOC or a recycling of PLANOUT.

Overlay PLNTPLAN, the second overlay, accepts output from PLANO1 (which includes the user target changes) and finalizes the sorties generated by the previous programs in the Sortie Generation subsystem.

The last overlay, INTRFACE, adds information to the output of PLNTPLAN, and creates tapes to be used in programs external to QUICK.

Inclusion of an entry on a parameter card as shown in the appendix (figure 149) allows, at the user's discretion, an automatic interface between PLANOUT and the SIDAC Model.

4.2 Executing Program PLANOUT

Program PLANOUT is the driver routine for executing subroutines PLANO1, PLNTPLAN and INTRFACE in an overlay mode of operation. PLANOUT is the main segment of the overlay structure and automatically calls in the other subroutines as required.

4.2.1 File Utilization. Figure 74 displays the use of files by program PLANOUT.

4.2.1.1 Input Files. The Strike File (STRKFILE) contains bomber and missile plans as output by POSTALOC. This file is used in PLANO1 and PLNTPLAN.

The Base File (BASFILE) is a data file created by PREPALOC to provide constant information pertaining to the current data base. BASFILE is used by all three overlays.

The Missile Time-On-Target File (MSLTIME) contains missile timing data and is used in PLNTPLAN.

The Strike Change 1 (SCHNG1) file is created in PLANO1 during a previous PLANOUT run. SCHNG1 contains records that were changed from the original STRKFILE by the user. Through recycling files, the user may make changes to changes. If SCHNG1 does not exist, STRKFILE is used for all missile and bomber plans.

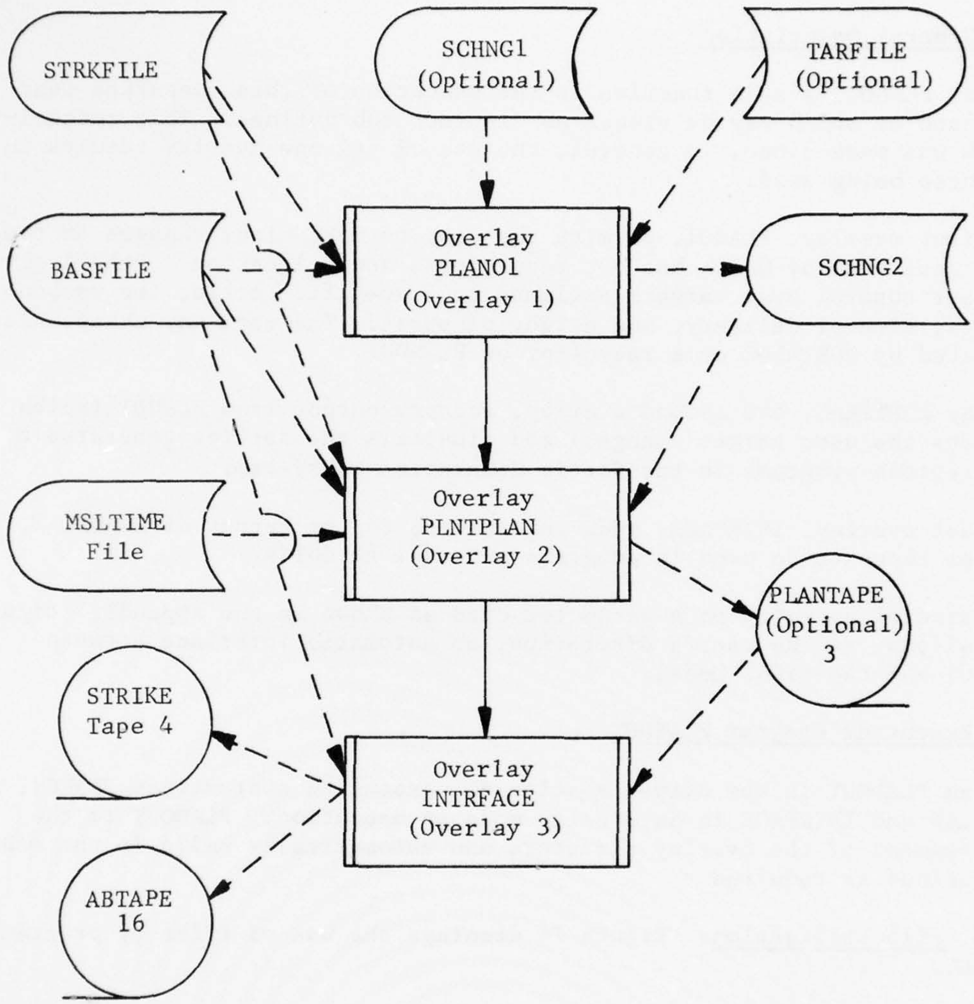


Figure 74. Program PLANOUT File Utilization

The Target File (TARFILE) is a target file created by PLANSET to provide information when a target is added or replaced on a given sortie. If no replacements or additions are performed, TARFILE is not required.

4.2.1.2 Output Files. The Strike Change 2 (SCHNG2) file is created in PLAN01 by merging records from STRKFILE, previous SCHNG1, and including any further changes specified on this run. SCHNG2 is used in PLNTPLAN and saved on spill tapes for possible future use. As used in future runs, SCHNG2 becomes the SCHNG1 file.

The Detailed Sortie Plan File (PLANTAPE) contains bomber, missile, and tanker plans in greater detail on the EVENTAPE for input to program INTRFACE and/or EVALALOC.

The Strike Tape (PTAPE) file contains the weapon delivery data required for detailed damage assessment.

The Sortie Specification Tape (ABTAPE) file contains the flight route and weapon delivery data required to simulate the execution of the missile and bomber missions using the NEMO and ESP simulation system.

4.2.1.3 Filehandler Buffer Utilization. The filehandler buffer areas used by the files of program PLANOUT are shown in figure 75.

FILE NAME	BUFFER NUMBER (LUN)
MSLTIME	7
SCHNG1	2
PLANTAPE	3
STRIKE(PTAPE)	4
STRKFILE	15
ABTAPE	16
BASFILE	8
SCHNG2	9
TARFILE	19

Figure 75. PLANOUT Filehandler Buffer Utilization

4.2.2 Input. The card inputs as used in each overlay are discussed in appropriate subsequent subsections.

4.2.3 Output. Output for each overlay is discussed in appropriate subsequent subsections.

4.3 Overlay PLANO1

4.3.1 General Description. PLANO1 is the first overlay of program PLANOUT and processes sortie change cards as input by sortie sequence number, change operation codes and DESIGs. PLANO1 merges these changes with the STRKFILE or, if desired, from a previous PLANOUT output file. The output file from PLANO1, SCHNG2, along with STRKFILE is used in PLNTPLAN (second overlay) to finalize plans. If the user does not change a given sortie, the final plan is generated from the STRKFILE; otherwise, the plan is generated from SCHNG2.

The sortie change cards permit the user to make minor target changes on any desired sortie but not requiring a new allocation. Via user inputs, control may be exercised over:

a. The target designator code (DESIG), impact time, weapon height of burst, Desired Ground Zero (DGZ) coordinates, and depenetration corridors.

b. Permit the capability to add, delete or replace complete strikes by sortie sequence number without having to specify times and so forth.

c. Provide for the creation of complete non-MIRV missile sorties.

4.3.2 File Utilization. Figure 76 displays the use of files by overlay PLANO1.

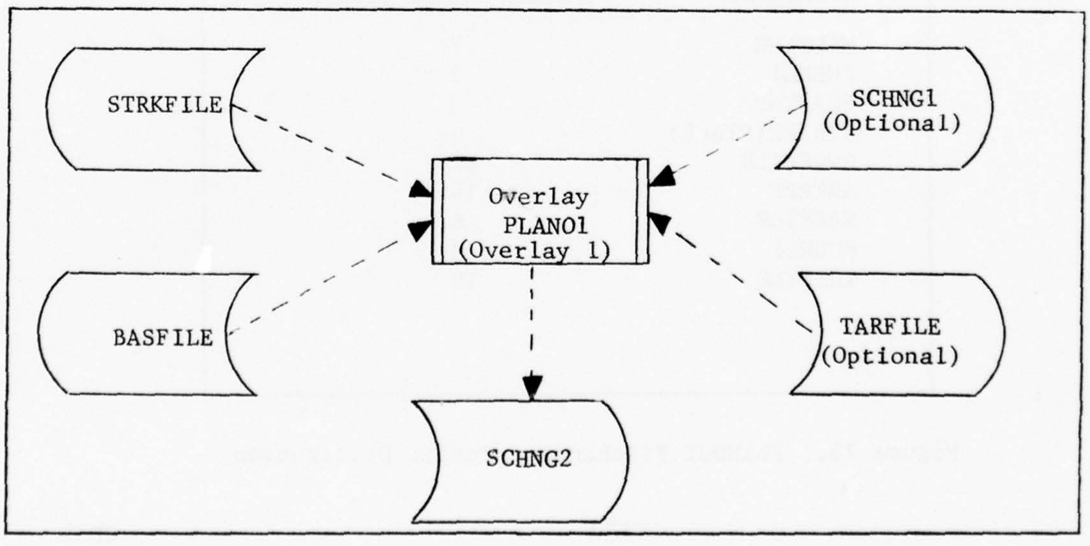


Figure 76. Overlay PLANO1 File Utilization

4.3.2.1 Input Files. The Strike File (STRKFILE) contains bomber and missile plans as output by POSTALOC.

The Base File (BASFILE) is a data file created by PREPALOC to provide constant information pertaining to the current data base.

The Missile Time-On-Target File (MSLTIME) contains missile timing data.

The Strike Change 1 (SCHNG1) file is a result of recycling a previous PLANOUT. SCHNG1 contains records that were changed by the user from the original STRKFILE. By recycling files, the user may make changes to changes. If SCHNG1 does not exist, STRKFILE is used for all missile and bomber plans.

The Target Designator Input File (TARFILE) is a target file created by PLANSET to provide information when a target is to be added or replaced on a given sortie. If no replacements or additions are performed, TARFILE is not required.

4.3.2.2 Output Files. The Strike Change 2 (SCHNG2) file is created by merging records from STRKFILE, a previous SCHNG1, and including any further changes specified on the sortie change cards. SCHNG2 is used in PLNTPLAN and saved on spill tapes for possible future use. As used in future runs, SCHNG2 becomes the SCHNG1 file.

4.3.2.3 Filehandler Buffer Utilization. The filehandler buffer areas used by the files of PLNTPLAN are shown in figure 77.

FILE NAME	BUFFER NUMBER (LUN)
MSLTIME	7
SCHNG1	2
STRKFILE	15
BASFILE	8
SCHNG2	9
TARFILE	19

Figure 77. PLNTPLAN Filehandler Buffer Utilization

4.3.3 Input. A series of fixed field input cards, as shown in figure 79, permits the user to make changes to the sorties generated in POSTALOC. If no changes are to be made a single card with an "E" in the first column is necessary. The sortie change cards must be ordered by the sortie sequence number (however, more than one card may be specified for a given sortie). If new missile sorties are added, the specification cards must follow all the change cards for existent sorties. For the sortie add option, the program will automatically assign sortie numbers, which will start two integers larger than the final sortie numbers of the original run. Since only a minimum number of checks are performed in this program, the user should insure the feasibility of any changes made, e.g., range, depenetration corridors, etc.

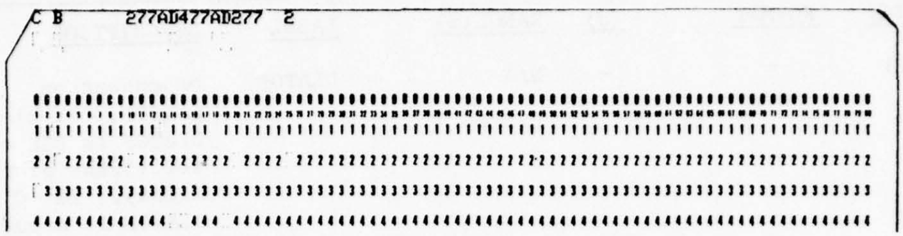
There are four operations associated with these change options:

"C" card indicates change strike

"I" card indicates insert strike

"A" card indicates add sortie

"E" card signals end of option; always required



COLUMN	FORMAT	(J)	RANGE(i)	LABEL	DESCRIPTION
1	Alphameric	R	(A,C,I, or E)	ICODE	Operation code*
2	Alphameric	R	(A or G)	IHOB	Height of burst option
3	Alphameric	R	(B or blank)	ISTYP	Sortie type*
4-5	Integer	R	(i ≤ 30)	IDCC	Depenetration corridor change
6	Alphameric	R	(A or blank)	IASM	ASM or bomb launch*
7	Alphameric	R	(N or blank)	IRAC	Attrition recalculation
8-12	Integer	R	(i ≤ 99,999)	ISSN	Sortie Sequential Number*
13-17	Alphameric	R	N/A	IDESIG1	DESIG1 reference*
13-14	Alphameric	R	N/A	IDESIG1	If operation code is "A" Country code of the launch base replaces DESIG1 reference*
18-22	Alphameric	R	N/A	IDESIG2	DESIG2 (new target, blank for delete)*
23-25	Integer	R	N/A	TCHANGE	Time of flight change (minutes)
26	Integer	R	(C or blank)	CALOFF	If blånk, offsets (DLATOF and DLONGOF) are entered directly. If 'C' DLATOF and DLONGOF represents the actual ground zero

*Items mandatory on appropriate code cards.

Figure 79. Sortie Change Card (Part 1 of 3)

COLUMN	FORMAT	(J)	RANGE(i)	LABEL	DESCRIPTION
27-33	-	-	N/A	DLATOF	Dependent on CALOFF. If blank DLATOF is DGZ off-set (50ths of n. miles). If 'C' DLATOF is actual latitude ground zero (floating decimal). DLATOF is set to 'ZERO' (left justified) if offset is to be set to numeric zero regardless of CALOFF
34-41	-	-	N/A	DLONGOF	Same as DLATOF, but for longitude.
42-46	Floating point	N/A	N/A	TLUCH	Time of launch (minutes)*
47-48	Integer	R	1-99	ILR	Launch region
49	Integer	R	(1 or 2)	IALS	Alert status
50-52	Integer	R		IMTI	Missile type index (plane type)
53-54	Integer	R	(20)	IPI	Payload index
55-57	Integer	R	(i≤250)	IGI	Group index
58-61	Integer	R	N/A	ISI	Site index
62-63	Integer	R	(i≤90)	LATD	Weapon site latitude (degrees)
64-65	Integer	R	(i≤60)	LATM	Weapon site latitude (minutes)
66-67	Integer	R	(i≤60)	LATS	Weapon site latitude (seconds)
68	Alphameric	R	(N or S)	LATR	Weapon site latitude reference (North or South)
71-73	Integer	R	(i≤360)	LONGD	Weapon site longitude (degrees)
74-75	Integer	R	(i≤60)	LONGM	Weapon site longitude (minutes)

*Parameters given in columns 42-80 are needed only for the missile add option. Items in columns 42-80 are mandatory for missile add option.

Figure 79. (Part 2 of 3)

COLUMN	FORMAT	(J)	RANGE(i)	LABEL	DESCRIPTION
76-77	Integer	R	($i \leq 60$)	LONGS	Weapon site longitude (seconds)
78	Alphameric	R	(E or W)	LONGR	Weapon site longitude reference (East or West)
79-80	Integer	R	($i \leq 24$)	ISAL	Missile salvo number

Figure 79. (Part 3 of 3)

The basic information needed on change or insert cards is the operations code ("C" or "I"); the sortie sequence number; the DESIGs involved; and optional information such as changed or new height of burst (air or ground); DGZ offsets from data base coordinates, etc. Additionally, the sortie type must be specified, either bomber or missile (B or blank in column 3). In the case of bomber type sorties the weapon will be defined in column 6 as (A) for ASM launch or (blank) for drop bomb. The user may specify the depenetration corridor for bomber sorties. If not specified, the corridor as given on the STRKFILE will be used.

4.3.3.1 <u>"C" Code:</u> DESIG1 (columns 15-19) will be dropped when DESIG2 (columns 21-25) is blank.

Strikes are replaced when both DESIG1 and DESIG2 are nonblank and not equal. DESIG1 will be replaced by DESIG2 (DESIG2 must be the representative target of a complex).

When DESIG1 equals DESIG2, elements of the strike are changed. This allows a change in down time, height of burst, offset characteristics or depenetration corridor.

If any of the change fields (Δt, ΔHOB, etc.) are blank and the target is not changed, the current values are used. When they are blank for a new target, default values will be assigned. The defaults will use normal times derived from distance, HOB as specified in program PREPALOC of zero (data base coordinates).

The Δt, ΔLAT and ΔLONG are signed quantities. Direction is positive (+) north or west and negative (-) south and east. Offsets are always computed from the data base locations of target with DESIG2.

There are two methods of defining offsets: (1) direct offset entry if parameter CALOFF is blank; and (2) entry of actual ground zero if parameter CALOFF equals 'C.' In order to set an existing offset to zero, 'ZERO' must be entered into DLATOF and/or DLONGOF.

When the target is not changed, the time of the bomb or ASM hit will be changed by the amount specified. In the case of missiles the down time will be changed but there will be no change to launch times. If the target is new, then Δt specifies the time change to be applied to the calculated time.

New attritions will always be calculated unless a "N" appears in column 7. For a depenetration corridor change, the last event of the sortie will always be set to DEPEN; this guarantees a two-way mission.

A bomber null sortie may be reestablished by setting DESIG1 blank and DESIG2 to the target to be struck. If more than one strike is desired, additional "C" code cards are used and must be in the order in which the targets are to be struck. All remaining options hold; i.e., Δt, ΔHOB, etc.

4.3.3.2 "I" Code: DESIG2 will be inserted after DESIG1. If DESIG1 is blank, DESIG2 will become the first target of the sortie. The discussion of optional information for "C" code on new targets applies to DESIG2. Only one target may be inserted after a given DESIG. If there is more than one "I" code card with the same DESIG1, the DESIG2 target as defined on the last card will be inserted and the other DESIG2 insert requests ignored.

This option is used for air delivered ordnance and MIRV capable missiles. In the case of bombers it may be used in conjunction with "C" code cards to change the order of strikes on a given sortie. However, if the program determines a switch in order of strikes is not mathematically optimal the changes will not be made.

4.3.3.3 "A" Code: Non-MIRV missile sorties are added by defining the data listed for columns 40-80 in figure 79. If no launch time is given, the program sets this time according to salvo number and launch interval. If simultaneous launches are desired, salvo numbers (columns 79-80) must be repeated for each round which is to be salvoed; i.e., if SIMLAUNCH is i, the missile salvo number j would be repeated i times in order to have i weapons launch at (j-i)*(launch interval). In the case of non-salvoed missiles and bombers, launch will occur at the earliest feasible time as determined by alert status, CORMSL, etc. If a launch time is specified, that value is added to the delay times discussed above. The country code of the launch base replaces the DESIG reference.

4.3.3.4 General. Some changes will necessitate the recalculation of the survival probability, attrition, and available low altitude range of a mission. Such changes are the addition or deletion of targets from the original sortie. Other changes, such as changing the time between targets should, strictly speaking, affect the available low altitude range and survival probability also; however, if the adjustments are small enough the user may not want the whole sortie disrupted by these calculations. Thus, on time changes the user will be able to select whether recalculation is desired. The default will be to recalculate the basic parameters. Of course, if the user opts for recalculation at any change on a sortie, all events will be affected.

If the time of arrival at a target is changed, all subsequent targets will be hit at their previously computed times plus that time increment (which may be negative). Targets earlier in the sortie will not be affected.

If a decrease in time has been input between strikes, the effect is to actually increase the speed of an aircraft. The actual speed will be calculated by dividing the distance by time between the two points and if this increase is greater than a data set percentage of the aircraft speed it will be considered to be an error. The time will be set to the maximum allowed time differential and an error message printed. The time error messages round down to the whole minute.

If the time between two points has been increased, or if a strike has been added to a sortie, the total range used by the sortie will be affected. This will be checked and if the range is greater than the maximum permitted range an error comment will be printed. Time increases are prorated back to the previous strike or in the case of first strike, back to "insector". Minimum speed is used to determine the allowable change.

Certain scenarios demand a two-way bomber mission: that is no bomber aborts. To ensure a two-way mission, the user must request at least one target replacement or deletion with a depenetration corridor change. Replaced or deleted targets must be such as to guarantee sufficient fuel for a two-way mission. The depenetration corridor option must be used even if the original corridor number is repeated. This request instructs a change from ABORT event to RECOVER.

4.3.4 Output. The printed output from PLAN01 consists of the print of all input cards and statements of options used. No debug prints are furnished.

If the first sortie change card has an "E" in the operation code field, the print below is given.

NO CHANGE SORTIE CARDS PROCESSED.

The only remaining print from PLAN01 is a card image of each sortie change card read.

PLAN01 error messages are shown in figure 80.

1.	***ERROR-DESIG(I) BAD NOT FOUND, COMMAND IGNORED DESIG,I, could not be found on the target file. Any updates to this sortie number will be ignored. If any error is detected on sortie cards, a message will be printed but all changes on the card generating the error (and on all cards with the same sortie sequence number) will be ignored.

Figure 80. PLAN01 Error Messages (Part 1 of 2)

2. REQUESTED INSERT AFTER DESIG1 (I), BUT UNABLE TO FIND DESIG1.
User requested an insert after DESIG1, but program could not locate DESIG1.

3. DESIG2 is BLANK
DESIG2 is blank on an insert card.

4. EXCEEDED MAXIMUM NUMBER OF EVENTS
User inserted too many events on a given sortie. Limits are 10 for bombers and 18 for missiles.

5. ERROR SORTIE NUMBERS OUT OF SORT, CARD DROPPED
The input sortie cards are not sorted by sortie sequential order.

6. ERROR, SORTIE NO. MISMATCH ON TAPES. STRKFILE=(I), STRKCHNG NO.=(J)
In using the STRKCHNG input option, the program read a sortie of I on STRKFILE and a value of J on STRKCHNG. They must be equal; the program will terminate.

7. ERROR, OPERATION CODE NOT A OR E, CARD DROPPED
After all the missile and bomber cards have been processed, the only valid operation is an A or E.

8. WRONG BASFILE FORMAT. REQUESTED ______GOT______.
The label information on the accessed BASFILE does not match that expected by the program. PLANOUT stops processing. Rerun job with correct BASFILE.

9. ERROR. RANGE LIMITS EXCEEDED. MAX RANGE=(X), CALCULATED RANGE=(Y), SORTIE SEQUENCE=(I)
For sortie sequence number, I, a bomber is requested to fly Y miles which is greater than the maximum of X miles. Error is probably caused by a user request on a sortie change card. Finalized plans are processed from the STRKFILE record.

10. TIME CHANGE TOO LARGE. TIME CHANGED TO MAX OF (I) MINUTES, SORTIE SEQUENCE=(J)
A target time change request on sortie sequence number J is too large; time reset to I minutes.

11. MISSILE SORTIE CHANGE REQUEST EXCEEDS RANGE LIMITS, TARGET=(I)
A sortie change request on target I exceeds missile range. Finalized plans are processed from the STRKFILE record.

Figure 80. (Part 2 of 2)

4.4 Overlay PLNTPLAN

4.4.1 General Description. Overlay PLNTPLAN, the second overlay of program PLANOUT, processes the bomber and missile plans provided on the STRKFILE by program POSTALOC or STRKCHNG from PLAN01, and writes these plans with tanker plans to the PLANTAPE which is used as input to programs INTRFACE and EVALALOC. Detailed prints of the final plan may also be obtained from PLNTPLAN.

Among the processing functions performed by PLNTPLAN on the input plans are:

a. Assigning refuel areas to bombers and allocating tankers to service them

b. Calculating ASM launch points

c. Determining where change altitude, and launch decoy events occur

d. Coordinating bomber and missile launch times according to user parameters

e. Calculating distances and times between all events of each plan.

The principal user input to overlay PLNTPLAN is the data describing the timing factors to be used for coordinating missile attacks. These cards will immediately follow the "E" operation code of the first overlay.

There are four categories in which the user may input options, on cards, to overlay PLNTPLAN. These are:

a. Print requests, whereby any of 12 optional print sets may be selected (optional)

b. Description of timing lines to be used by the missile attack coordination calculations (optional)

c. Missile coordination parameters (CORMSLs), when timing calculations are to be based either on the fraction of flight completed by time = 0 (FLIGHT CORMSL) or on the time due to cross any of the specified timing lines (LINE CORMSL) (optional)

d. Selective processing options, allowing the user to cause only certain bomber sorties to be processed by PLNTPLAN

and, if desired, to provide for a core dump print after the processing of a data segment.

4.4.2 File Utilization. Figure 81 displays the use of files by overlay PLNTPLAN.

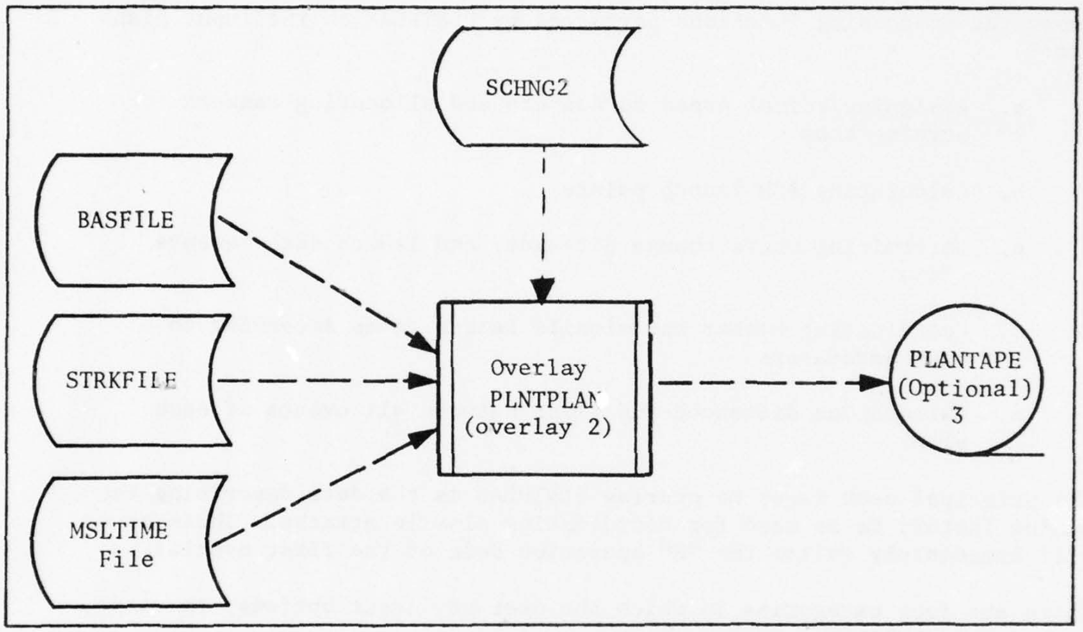


Figure 81. Overlay PLNTPLAN File Utilization

4.4.2.1 Input Files. The Strike File (STRKFILE) contains bomber and missile plans as output by POSTALOC.

The Base File (BASFILE) is a data file created by PREPALOC to provide constant information pertaining to the current data base.

The Missile Time-On-Target File (MSLTIME) contains missile timing data.

The Strike Change 2 (SCHNG2) is created in PLAN01 and contains STRKFILE information plus changes requested via cards.

4.4.2.2 Output Files.

The Detailed Sortie Plan File (PLANTAPE) contains bomber, missile, and tanker plans in greater detail than on the EVENTAPE for input to Overlay INTRFACE and/or EVALALOC.

4.4.2.3 Filehandler Buffer Utilization. The filehandler buffer areas used by the files of PLNTPLAN are shown in figure 82.

FILE NAME	BUFFER NUMBER (LUN)
STRKFILE	15
BASFILE	8
MSLTIME	7
PLANTAPE	3
SCHNG2	9

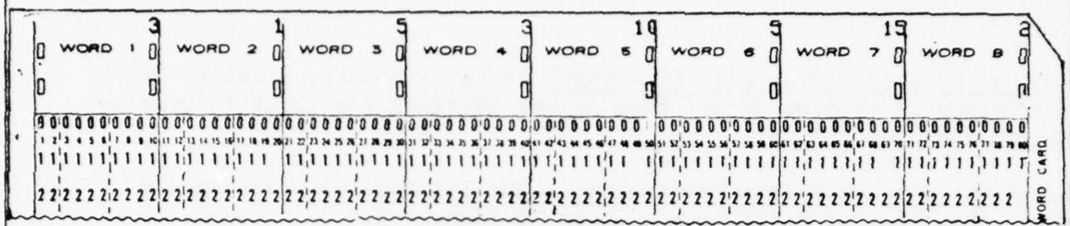
Figure 82. PLNTPLAN Filehandler Buffer Utilization

4.4.3 Input. Each input card, in the discussion that follows, corresponds to one of the categories of user options listed in section 4.4.1. Each is entered in the standard data card format; i.e., eight words of 10 columns each.

The cards must be input in the order in which they are listed. In most cases, even when no options of the given type are to be requested, the blank card which indicates the end of input pertaining to that option type must be present.

4.4.3.1 Type 1 Parameter Card: Print Requests. Up to 40 separate print requests may be submitted for optional printed reports during PLNTPLAN processing. One request is made per card. There are 14 optional print sets. Within these, further subsets, specified for most prints by group, corridor, and/or sortie, may be selected by the user for printing. A blank card signals the end of the print request cards and must be present even when no print request is made.

The sample card in figure 83 illustrates the general format of print request cards. The values for REQUEST are given in table 4. Some of the requests do not use all of the possible variables. For each print, Y means that this is a permissible variable for the option, while N



WORD	FORMAT	J	RANGE	LABEL	DESCRIPTION
1	Integer	R	(1-15)	REQUEST	Print request number, described in table 4
2	Integer	R	(1-250 or blank)	IGROUP	Group number for which print is to start
3	Integer	R	($i \geq 1$ or blank)	ICORRIDOR	Starting corridor number
4	Integer	R	($i \geq 1$ or blank)	ISORTIE	Starting sortie number
5	Integer	R	($i \geq 1$ or blank)	LGROUP	Group number after which print is to stop
6	Integer	R	($i \geq 1$ or blank)	LCORRIDOR	Last corridor number
7	Integer	R	($i \geq 1$ or blank)	LSORTIE	Last sortie number
8	Integer	R	($i \geq 1$ or blank)	FREQUENCY	Desired frequency of print; if blank, it is assumed to be 1

Figure 83. Type 1 Parameter Card: Print Requests

Table 4. List of Print Requests

PRINT REQUEST NO.	PRINT SET	SELECTION KEYS GROUP	CORRIDOR	SORTIE
1	STRKFILE input print	Y	Y	Y
2	Final PLANTAPE (full version)	Y	Y	Y
3	Detailed plan (bombers)	Y	Y	Y
3	Detailed plan (tankers)	-1*	N	N
4	Not used			
5	LAUNCH subroutine	Y	Y	Y
6	ASM adjustment	Y	Y	Y
7	Precorridor legs	Y	Y	N
8	Depenetration corridor	Y	Y	Y
9	BASFILE input	N	N	N
10	Plot control**	Y	Y	Y
11	ADJUST subroutine	Y	Y	Y
12	Not used			
13	Timing information	Y	Y	Y
14	Termination control***	Y	Y	Y
15	Missile plan	N	N	N

*Tanker prints are selected by -1 in group field
**Plot control is not available for the current version of QUICK
***Process tanker plans and terminate after the indicated sortie

indicates that the variable is undefined for this print. The most commonly used prints are numbers 3 and 15.

If both IGROUP and LGROUP are blank when applicable, all groups will be printed. If both ICORRIDOR and LCORRIDOR are blank, all corridors of the specified group(s) will be printed; blank ISORTIE and LSORTIE reflect a similar request. A single group may be chosen by entering the group number in IGROUP and leaving LGROUP blank. The same procedure may be followed for corridor and sortie.

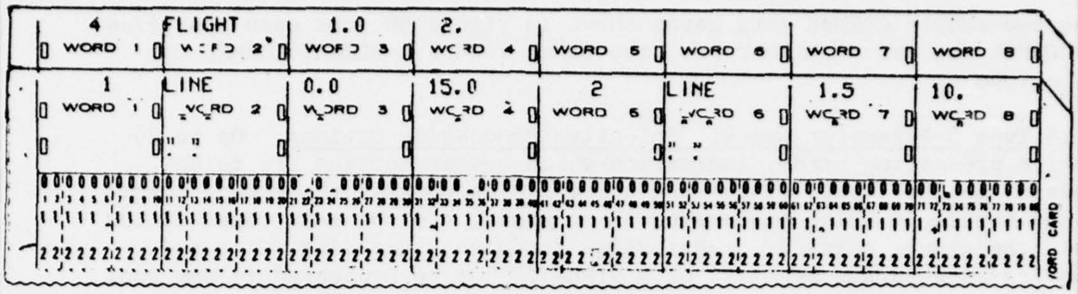
The sample print request card in figure 83 causes print option 3 (detailed bomber plan) to be turned on for sorties 3 through 15, for corridor 5 only, for groups 1-10 inclusive, and prints every second plan.

4.4.3.2 Type 3 Parameter Card: Missile Timing Lines. For time-coordinated missile attacks (first strike plans), the user may specify a FLIGHT CORMSL or a LINE CORMSL for missile launch time calculations. A FLIGHT CORMSL is the fraction of the missile's flight which will be completed at game time = 0. A LINE CORMSL states the time at which the missiles are to cross any of up to 50 user-designated timing lines, which are straight-line segments, not necessarily connected.

When LINE CORMSLs are to be specified, missile timing line parameter cards must be input with descriptions of the timing lines to be used. The data card format, on which either one or two lines may be described, is shown in figure 84.

The maximum number of lines to be input is 50. If desired, words 5 through 8 may be left blank on any card. The set of data cards is terminated by a blank card which must be present even when no lines are to be input.

The order in which the endpoints of line segments are input is important. Each line must be input such that the first endpoint encountered would be to the left or portside of the missile path as it crosses the line. Figure 85 shows the necessary configuration; the data for the left endpoint, P, must precede the data for the right endpoint, Q. At time t = CORMSL (specified in the following type of option card) the missile will be at point X.



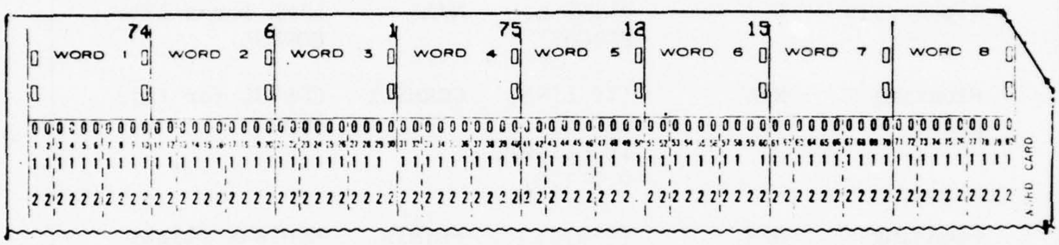
WORD	FORMAT	(J)	RANGE(i)	LABEL	DESCRIPTION
1	Integer	Columns 1-8	(1-80)	TYPE	Plan Generator type index*
2	Alphameric	L	(LINE or FLIGHT)	N/A	LINE for a line CORMSL
3	Floating point	N/A	(If LINE, $i>0.0$; if FLIGHT, 0.0-1.0)	CORMSLX	CORMSL for this type
4	Floating point	N/A	($i\geq 0.0$)	FLTMIN	Minimum flight time (minutes)
5	Integer	Columns 41-48	(1-80)	TYPE	Plan Generator type number
6	Alphameric	L	(LINE or FLIGHT)	N/A	Line for a line CORMSL
7	Floating point	N/A	(If LINE, $i>0.0$; if FLIGHT, 0.0-1.0)	CORMSLX	CORMSL for this type
8	Floating point	N/A	($i\geq 0.0$)	FLTMIN	Minimum flight time (minutes)

*The Plan Generator type index required here is the LTYPE number assigned by program PLANSET and printed by PLANSET under "Weapon Type Data."

Figure 86. Type 4 Parameter Cards: CORMSL Data

In the two sample CORMSL data cards shown in figure 86, one card specifies LINE CORMSL for two missile types; the other inputs a FLIGHT CORMSL for missile type 4.

4.4.3.4 Type 5 Parameter Cards: Selective Processing Options. Up to 20 selective processing cards, indicating which bomber sorties are to be processed, may be input. The first three fields contain the group, corridor, and sortie at which processing is to begin, and the next three fields contain the group, corridor, and sorties at which processing is to end. As many as 20 separate segments of a STRKFILE may be processed in one run. These cards must be input in the order in which the corresponding data appear on the STRKFILE. If the entire file is to be processed, only the terminating card for this card set is included. The format of selective processing data cards is shown in figure 87.



WORD	FORMAT	(J)	RANGE	LABEL	DESCRIPTION
1	Integer	R	1-250	KBGRP	Group at which processing is to begin
2	Integer	R	1- 99	KBCORR	Corridor at which processing is to begin
3	Integer	R	1- 99	KBSORT	Sortie at which processing is to begin
4	Integer	R	1-250	KEGRP	Group at which processing is to end
5	Integer	R	1- 99	KECORR	Corridor at which processing is to end
6	Integer	R	1- 99	KESORT	Sortie at which processing is to end

Figure 87. Selective Processing Parameter Card

HEADING	LABEL	DESCRIPTION
1	LINES	Number of timing lines
2	NO	Timing line number
3	ZLAT1	Latitude of left endpoint of line
4	ZLONG1	Longitude of left endpoint
5	ZLAT2	Latitude of right endpoint
6	ZLONG2	Longitude of right endpoint
7	LENGTH	Length of timing line (nautical miles)
8	XCROSS	X-coordinate of cross product
9	YCROSS	Y-coordinate of cross product
10	ZCROSS	Z-coordinate of cross product
11	LTYP	Plan Generator type number
12	TYPE	= 0 for FLIGHT CORMSL = 1 for LINE CORMSL
13	CORMSL	CORMSL for this type in hours (if equal to -1.000E 08, it is ignored)
14	MIN FLT	Minimum flight time in hours
15	FIRST FIXED GROUP	Group number of first group with fixed assignments (1000 indicates no fixed assignments)

Figure 89. (Part 2 of 2)

There are three printouts which give information used by PLNTPLAN's subroutine VAM. VAM applies Vogel's Approximation Method to the transportation problem of assigning available tankers to refuel areas where automatic tanker allocation is to be performed. These prints are output mainly for use by QUICK system programmers. The prints are:

a. The COST matrix, giving the contents of the FORTRAN array by the same name. Row i refers to tanker base i; column j to refuel area j. The entry in COST (i, j) is the distance between tanker base i and refuel area j. The matrix is printed up to 20 columns to a page.

b. The SOURCE/SINK table, printing for each integer I:
SOURCE(I) = N, where N is the number of tankers available for automatic allocation at tanker base I
SINK(I) = M, where M is the number of bombers which have been assigned to refuel at refuel area I.

c. The VAM solution, showing the elements of the X(i, j) matrix which constitute the final feasible solution to the transportation problems. Again, i = the tanker base number, and j = the refuel area number. The value for X(i, j) = the number of tankers to be allocated from tanker base i to refuel base j. At the end of the X(i, j) matrix, VAM prints "TOTAL COST = N," where N is the total number of tanker miles to be flown using this solution for the allocation.

Examples of the three VAM prints are shown in figure 90.

When nearing the end of execution, PLNTPLAN prints out the following self-explanatory messages:

```
 720 TANKER PLANS PROCESSED
 704 BOMBER PLANS PROCESSED
1564 MISSILE BOOSTER PLANS PROCESSED TO GO TO 3521 TARGETS.
   0 PLANS EXCEED 80 LINES
```

The tanker allocation table is also shown, giving the final assignments of tankers to refuel areas. A sample table is shown in figure 91.

After all missions have been processed, PLNTPLAN prints out the Sortie Sequence Numbers of the bombers that could not return to a recovery base (figure 91.1) and the bombers that were not fully utilized (figure 91.2); that is, bomber sorties that did not drop its entire weapon load.

After the Sortie Sequence prints, recovery base summaries are printed (figure 91.3). For each recovery base, a print of the name, base capacity, and the total number of aircraft returning is produced followed by a count of aircraft returning per weapon group.

BOMBER SORTIES NOT FULLY UTILIZED

288 298 308 314 316 317 342 355 363 383 385 406 426
434

Figure 91.2 Bomber Sorties Not Fully Utilized

	①			②		③
RECOVERY BASE	AB2		TOTAL CAPACITY	60	TOTAL	3
GROUP	12	14	④			
AIRCRAFT	1	2	⑤			

HEADING	DESCRIPTION
①	Recovery base name
②	Recovery base capacity
③	Number of aircraft landing at recovery base
④	List of weapon groups that has aircraft returning to ①
⑤	Number of aircraft returning to ① per weapon group

Figure 91.3 Recovery Base Summary

The standard output ends with the messages:

```
NUMBER OF BUDDY TANKERS = N
CHECKSUM = M
***** PROCESSOR PLNTPLAN COMPLETED ****1
```

where N = the number of bomber refuelings accomplished by buddy tankers and M = the sum of /DINDATA/ contents in fixed point.

PLNTPLAN also furnishes various detailed prints and debug prints as described below.

4.4.4.1 Print Option 3: Detailed Bomber and/or Tanker Plans. PLNTPLAN print option 3 describes detailed plans for bomber sorties (when GROUP is not equal to -1) and/or for tankers (when GROUP equals -1).

Figure 92 shows a sample bomber sortie print. The headings are the same for tanker plan prints.

4.4.4.2 Print Option 15: Detailed Missile Plans. PLNTPLAN print option 15 gives detailed missile plans for each missile base. Figure 93 shows a sample missile plan print.

4.4.4.3 Print Option 1: OUTSRT Record (Debug Print) Print 1 shows the contents of the STRKFILE input record(s) for each bomber sortie (contents of common block /OUTSRT/). Figure 94 shows a sample print option 1.

4.4.4.4 Print Option 2: Final Plan (Debug Print). There are two separate prints associated with print request 2: the final bomber plans (figure 95) and the final missile plans (figure 97).

(1) PRINT NUMBER 3 DETAILED PLAN
(2) SORTIE SEQUENCE 285

(3) SIDE 1 GROUP 12 CORRIDOR 7 SORTIE 5 INBASE 2108 INDV 4 MHT= 36 NPL= 19 IREG= 1 IALERT= 1 TYPE= 2
(4) IREF= -4 ASSIGNED REF= 5 IDPEN= 4 ASSIGNED DEPEN= 0. 0 PAYLOAD= 4 FUNCTION=LRA

(5)	TIME (6) (HDT)	PLACE (7) (KPL)	EVENT (8) (JTP)	EVENT TYPE (9)	LATITUDE (10)	LONGITUDE (11)	CUMULATIVE (12) TIME	WARHEAD (13) TYPE	DGX (14)	DGY (15)	DESIG (16)
1	-7.740	2108	2	LAUNCH B	0441200N	1030559W	-7.74	0	0	0	00000
2	3.093	5	4	REFUEL	0690850N	1061522W	-4.65	0	0	0	00000
3	4.660	51	5	INSECTOR	0730000N	0850000E	0.01	0	0	0	00000
4	0.000	0	20	DOGLEG	0730000N	0850000E	0.01	0	0	0	00000
5	0.000	0	19	GO LOW	0730000N	0850000E	0.01	0	0	0	00000
6	3.388	0	18	GO HIGH	0603643N	0612910E	3.40	0	0	0	00000
7	0.139	2839	8	DROPBOMB	0593609N	0602904E	3.54	1	8	23	AD741UR
8	0.036	2380	8	DROPBOMB	0594500N	0600000E	3.58	1	0	0	AD444UR
9	0.115	39	5	INSECTOR	0590000N	0585449E	3.69	0	0	0	00000
10	0.063	1	14	LAUN ASM	0583537N	0581916E	3.75	4	-6	11	AD703UR
11	0.328	2807	0	ASM TGT	0564752N	0531134E	4.08	0	-6	11	00000
12	0.046	2801	8	DROPBOMB	0581733N	0575440E	3.80	1	-11	-17	AD709UR
13	0.416	38	5	INSECTOR	0570633N	0520000E	4.22	0	0	0	00000
14	0.621	1	14	LAUN ASM	0552502N	0432727E	4.84	4	77	52	AD448UR
15	0.335	2735	0	ASM TGT	0554633N	0373408E	5.17	0	77	52	00000
16	0.164	2384	8	DROPBOMB	0545659N	0411800E	5.00	1	0	0	AD637UR
17	0.304	44	5	INSECTOR	0522959N	0410314E	5.30	0	0	0	00000
18	1.302	68	5	INSECTOR	0420000N	0400000E	6.61	0	0	0	00000
19	0.000	2402	16	RECOVER	0420000N	0400000E	6.61	0	0	0	00000

Figure 92. PLNTPLAN Print Option 3: Detailed Bomber Plan (Maintenance Print) (Part 1 of 4)

HEADING	LABEL	DESCRIPTION
1	PRINT NUMBER	Print request number, as on print request card
2	SORTIE SEQUENCE	Sortie sequence number
3	SIDE	Side for which plan is generated: 1 = BLUE, 2 = RED
	GROUP	Weapon group index number, as assigned in program PLANSET
	CORRIDOR	Penetration corridor index number for weapon
	SORTIE	Sortie index number
	INBASE	Launch base index number
	INDV	Index to the individual vehicles on the base
	MHT	Total number of event lines in the plan
	NPL	Number of event lines
	IREG	Geographic command and control region index number
	IALERT	Index to alert status: 1 = alert, 2 = nonalert
	TYPE	Index to the weapon type table
4	IREF	Refueling index number: IREF Greater than 0 = Number of user-assigned refuel area 0 = No refuel -1 = Buddy refuel -2 = Buddy refuel: original number/squadron halved -3 = Air-breathing missile -4 = Single automatic refuel -5 = Two refuels required, both automatic
	ASSIGNED REF	Index of refuel area assigned if automatic tanker allocation is utilized
	IDPEN	Depenetration corridor index number
	ASSIGNED DEPEN	Depenetration corridor index number is reassigned here when last target is an ASM target; values are supplied for both primary and alternate sorties
	PAYLOAD	Index to payload table
	FUNCTION	Weapon function code

Figure 92. (Part 2 of 4)

HEADING	LABEL	DESCRIPTION
5	---	Sequence number of events within sortie plan (History table index) and a "C" if the event was changed
6	TIME (HDT)	Time between events in hours; in line one, the value represents the time from start of game
7	PLACE (KPL)	Represents the index numbers of launch bases, refuel areas, targets, and recovery points; for LAUNDCOY events, it is the number of decoys launched (if positive) or terminated (if negative); otherwise, KPL is zero
8	EVENT (JTP)	Index numbers to QUICK simulator event codes
9	EVENT TYPE	Mnemonic indentifier of event

LAUNCH M = Launch missile
LAUNCH B = Bomber launch
REFUEL = Refuel
DROPBOMB = Drop bomb
MISATTR = Missile attrition event
ENTERREF = Enter refuel area (tankers)
LEAVEREF = Leave refuel area (tankers)
ABORT = Abort
LAUN ASM = Launch ASM
LAUNDCOY = Launch decoy
RECOVER = Recover
CHANGALT = Change altitude
GO HIGH = Go to high altitude
GO LOW = Go to low altitude
DOGLEG = Dogleg

Figure 92. (Part 3 of 4)

HEADING	LABEL	DESCRIPTION
10	LATITUDE	Latitude of event in geographic coordinates
11	LONGITUDE	Longitude of event in geographic coordinates
12	CUMULATIVE TIME	Cumulative time at each event
13	WARHEAD TYPE	Warhead index number; nonzero only for DROPBOMB OR LAUN ASM events
14	DGX	Target offset in fiftieth of nautical miles (positive west)
15	DGY	Target offset in fiftieth of nautical miles (positive north)
16	DESIG	Target Designator plus Country Location

Figure 92. (Part 4 of 4)

(1) SORTIE SEQUENCE 6

(2) GROUP 1 TYPE NAME 000000 TYPE 0 IALERT 1 PAYLOAD 9 REGION 1 TMLAUM 0. FUNCTION 000000

(3) MISSILE INDEX	(4) INDEX	(5) SITE LAT.	(6) LONG.	(7) INDEX	(8) TARGET LAT.	(9) LONG.	(10) FLIGHT TIME	(11) DESIG	(12) TSK	(13) CNTRY	(14) F	(15) HOB
6	456	46.0	101.0	1686	50.4	329.5	0.387	AB139	AB	UR	0	1
6	456	46.0	101.0	1686	50.4	329.5	0.387	AB139	AB	UR	0	1
6	456	46.0	101.0	1686	50.4	329.5	0.387	AB139	AB	UR	0	1

HEADING	LABEL	DESCRIPTION
(1)	SORTIE SEQUENCE	Sortie sequence number
(2)	GROUP	Weapon group number
	TYPE NAME	Missile type
	TYPE	Missile type index
	IALERT	Alert status (1=alert, 2=nonalert)
	PAYLOAD	Payload index
	REGION	Launch region
	TMLAUM	Time of launch
	FUNCTION	Weapon function code
(3)	MISSILE INDEX	Missile index
(4)	INDEX	Site index
(5)	SITE LAT.	Weapon site latitude
(6)	LONG.	Weapon site longitude
(7)	INDEX	Target index
(8)	TARGET LAT.	Target latitude
(9)	LONG.	Target longitude
(10)	FLIGHT TIME	Flight time (hours)
(11)	DESIG	Target designator code
(12)	TSK	Target task code
(13)	CNTRY	Target country code
(14)	F	Target flag
(15)	HOB	Height of burst (0=ground; 1=air)

Figure 93. PLNTPLAN Print Option 15: Detailed Missile Plan (Maintenance Print)

```
                 PRINT NUMBER   1  OUTSORT RECORD
(1)    SORTIE SEQUENCE    279

(2)  GROUP  12  CORRIDOR  7  SORTIE    2  VEHICLE NO.    3  BASE NO. 2106  BASE LAT.   46.40  BASE LONG,    84.40
(3)  PAYLOAD INDEX   4  IREFUEL  -4  IDPEN   4  GOLOW1       0.0  GOLOW2   520.8  GOLOW3  1390.6  TYPE   2
(4)  SPDHI  485.0  SFDLO  270.0  RANGE  8200.0  RANGEREF  9700.0  DELAY 0.01   NHAP= 8  IREG=    1  IALERT= 1

(5)                   1          2          3          4          5          6          7          8
(6)     IBTYPE   DOGLEG     DROPBOMB   DROPBOMB   AIM ASM    AIM ASM    DROPBOMB   DROPBOMB   DEPEN
(7)      DBLAT     73.00       64.63      57.80      57.30      57.00      57.60      56.90       0.00
(8)     DBLONG    275.00      319.27     319.10     322.40     318.10     319.86     318.60       0.00
(9)      IBJEC         7        2161       2818       2810       2768       2171       2841          4
(10)     IBDES     00000       AB149      AD720      AD712      AD670      AB137      AD743      00000
(11)     IBISK        00          AB         AD         AD         AD         AB         AD         00
(12)     IBCTY        00          UR         UR         UR         UR         UR         UR         00
(13)     IBFLG         0           0          0          0          0          0          0          0
(14)      DLAT      0.00        0.00       0.00      -0.00      -0.00       0.00      -0.00       0.00
(15)     DLONG      0.00        0.00       0.00       0.00       0.00       0.00      -0.00       0.00
(16)   ATTROUT     0.001       0.000      0.000      0.000      0.000      0.000      0.000      0.000
(17)   SURVOUT     1.000       0.958      0.912      0.912      0.912      0.909      0.903      0.811
```

Figure 94. PLNTPLAN Print Option 1: Input Record
(Part 1 of 3)

HEADING	LABEL	DESCRIPTION
8	HLO	Longitude
9	TZT	Weapon offset latitude
10	TZN	Weapon offset longitude
11	IWH	Weapon type index
12	PA	Probability of arrival at the target
13	CMT	Cumulative time
Target List		
14	INDEX	Target index
15	DESIG	Target designator code
16	TASK	Target task code
17	COUNTRY	Target country code
18	FLAG	Target flag
19	HOB	Height of burst (0 - ground; 1 - air)

Figure 95. (Part 3 of 3)

```
(1) SORTIE SEQUENCE    254

(2) SIDE 1   GROUP 10   MCOUNT  260   CLASS 1   TYPE  6   REG  3   IALERT 1   PAYLOAD 14
(3) N.MISS.  1  N.TAR.  1  TMLAUN  0.12  PGTYPE  2  TYPE NAME PCL-A2   FUNCTION 00000000

  (4) MISSILE   (5)    SITE(6)   (7)      (8)    TARGET(9)   (10)     FLIGHT (11)  (12)    (13)  (14)  (15)  (16)
      INDEX    INDEX   LAT.   LONG.     INDEX    LAT.      LONG.    TIME         DESIG   TSK   CNTRY  F    HOB
          8     1091   40.0   217.0      2859    31.1      238.5    0.200        AD761   AD    CH     0    1
```

Figure 97. PLNTPLAN Print Option 2: PLANTAPE Missile Plan (Part 1 of 2)

HEADING	LABEL	DESCRIPTION
1	SORTIE SEQUENCE	Sortie sequence number
2	SIDE	Side (1=BLUE, 2=RED)
	GROUP	Group index
	MCOUNT	Count of number of missiles processed
	CLASS	Target class (missiles = 1)
	TYPE	Missile type
	REG	Launch region
	IALERT	Alert status (1=alert, 2=nonalert)
	PAYLOAD	Payload index
3	N.MISS.	Number of missiles
	N.TAR.	Number of targets assigned to missile
	TMLAUN	Time of launch
	PGTYPE	Weapon type number from BASFILE
	TYPE NAME	Weapon type name
	FUNCTION	Weapon function code
4	MISSILE INDEX	Missile index
5	SITE INDEX	Site index
6	SITE LAT.	Weapon site latitude
7	LONG.	Weapon site longitude
8	INDEX	Target index
9	TARGET LAT.	Target latitude
10	LONG.	Target longitude
11	FLIGHT TIME	Flight time (hours)
12	DESIG	Target designator code
13	TSK	Target task code
14	CNTRY	Target country code
15	F	Target flag
16	HOB	Height of burst (0 - ground; 1 - air)

Figure 97. (Part 2 of 2)

```
PRINT NUMBER   5                LAUNCH SNAP
   (1) U1=  59.600 (2) V1=  209.300 (3) U2=  69.770 (4) V2=  178.550 (5) UAT=  68.790 (6) VAT=  179.470 (7) RASM=  200.0
 TARGET IS IN RANGE OF PATH
(8) FRACPATH=  0.7212 (9) DISGC=   205.6 (10) RLAT=  66.934 (11) RLONG= 187.124
```

HEADING	LABEL	DESCRIPTION
(1)	U1	The point from which the bomber is flying
(2)	V1	
(3)	U2	The point to which the bomber is flying
(4)	V2	
(5)	UAT	The target point at which an ASM is to be fired
(6)	VAT	
(7)	RASM	The ASM range
(8)	FRACPATH	Fraction of total path at which ASM is launched
(9)	DISGC	The distance between (RLAT, RLONG) and (UAT, VAT)
(10)	RLAT	The point from which the ASM is to be fired
(11)	RLONG	

Figure 99. PLNTPLAN Print Option 5: LAUNCH Snap

4.4.4.6 Print Option 5: LAUNCH Subroutine (Debug Print). Subroutine LAUNCH determines the aim point or launch point at which an ASM is to be fired. Should the QUICK system programmer need to trace these calculations, print 5 will show the contents of common block/LASM/ just before completing LAUNCH. This print is shown in figure 99.

4.4.4.7 Print Option 6: ASM Adjustment (Debug Print). Print request 6 causes most of the contents of common block /ASMARRAY/ to be output during the reordering of ASM events in PLAN block 40. Those variables are shown in figure 100.

4.4.4.8 Print Option 7: Precorridor Legs (Debug Print). This print shows the precorridor legs as listed in common block /HAPPEN/; in PLNTPLAN, that block is included in common /C9/. Figure 101 shows a sample print 7.

4.4.4.9 Print Option 8: Depenetration Corridor (Debug Print). This print, shown in figure 102 displays the depenetration corridors from common block /HAPPEN/ (included in common /C9/ by PLNTPLAN).

4.4.4.10 Print Option 9: A partial Print of the BASFILE Input (Debug Print). Figure 103 shows a print 9 sample.

4.4.4.11 Print Option 11: ADJUST Subroutine. Subroutine ADJUST examines the target section of each bomber plan to see where GO HIGH and GO LOW events are to be placed with respect to the target events. Print 11, shown in figure 104, enables a QUICK system programmer to inspect the contents of key variables both before and after subroutine ADJUST has executed.

4.4.4.13 Print Option 13: Timing Information. This print is that issued by the library subroutine TIMEME, called at various points within PLNTPLAN. Subroutine TIMEME is discussed in the documentation of the QUICK library. The print is shown in figure 106.

4.4.4.14 Print Option 14: Termination Control. Print request 14 will cause PLNTPLAN execution to stop when it encounters the group, corridor, and sortie that are specified on the print 14 request card.

The message that prints to indicate that this request has been acted upon by the program is shown below.

```
        PRINT NUMBER 14

                            TERMINATION
```

PRINT NUMBER 6

/ASMARRAY/

1 ALAT	2 ALON	3 IFLY	4 IDIS	5 IORD	6 OBLAT	7 OBLONG
68.000	199.000	1	0	1	68.000	199.000
59.600	209.300	1	20000	2	59.600	209.300
66.934	187.124	1	20939	4	68.790	179.470
66.841	183.150	1	30000	3	69.770	178.550
60.000	175.000	1	50000	5	60.000	175.000

PRINT NUMBER 6

/ASMARRAY/

ALAT	ALON	IFLY	IDIS	IORD	OBLAT	OBLONG
68.000	199.000	1	0	1	68.000	199.000
59.600	209.300	1	20000	2	59.600	209.300
66.934	187.124	1	30000	3	68.790	179.470
66.841	183.150	1	40000	4	69.770	178.550
60.000	175.000	1	50000	5	60.000	175.000

PRINT NUMBER 6

HEADING	LABEL	DESCRIPTION
1	ALAT	Aim point latitude
2	ALON	Aim point longitude
3	IFLY	Fly point flag
4	IDIS	Distance, fly point to ASM target
5	IORD	Sort index
6	OBLAT	Target latitude (from/OUTSRT/)
7	OBLONG	Target longitude (from/OUTSRT/)

Figure 100. PLNTPLAN Print Option 6: ASM Adjustment

PRINT NUMBER 9 BASFILE INPUT

① IHDATE=04/15/73 IDENTNO= 042325 ISIDE=BLUE NCOHR=12 NGROUP= 17 NPAYLOAD=15 NASMTYPE= 2 NTANKBAS= 30

② INITSTRK= 1 CORBOMB= 0.0

④ ASM TABLE

⑤

	IWHDASM	RANGEASM	RELASM	CEPASM	SPEEDASM
1	4	200.0	1.000	1.00	600.0
2	5	60.0	1.000	1.00	500.0

⑥ PAYLOAD TABLE

⑦

	NOBOMB1	IWHD1	NOBOMB2	IWHD2	NASM	IASM	XDEG	NCM	NDECOYS	NADECOYS	PAYALT
1	2	1	0	0	0	0	0.000	0	0	0	HIVAL
2	2	2	0	0	0	0	0.000	0	0	0	HIVAL
3	1	3	0	0	0	0	0.000	1	0	0	HIVAL
4	4	1	0	0	2	1	0.000	1	0	0	LOW
5	2	3	0	0	2	1	0.000	2	2	0	HIGH
6	2	2	0	0	0	0	0.000	1	2	0	HIVAL
7	2	2	0	0	2	1	0.000	1	0	0	HIVAL
8	1	3	3	1	0	0	0.000	1	0	0	HIVAL
9	1	10	0	0	0	0	1.000	768	2	2	HIVAL
10	1	1	0	0	0	0	1.000	768	0	0	HIVAL
11	1	1	0	0	0	0	1.000	768	0	0	HIVAL
12	1	3	0	0	0	0	1.000	768	0	0	HIVAL
13	1	11	0	0	0	0	1.000	768	0	0	HIVAL
14	3	9	0	0	0	0	1.000	768	0	0	HIVAL
15	3	9	0	0	0	0	1.000	768	0	0	HIVAL

⑧ I,REL(I)= 1,0.56 2,0.60 3,0.90 4,0.90

⑨ I,IWHTYPE(I)= 1,TITAN 2,PCL-A2 3,B-52G 4,B-58

⑩ I,PGTYPE(I)= 1, 2 2, 2 3, 2 4, 2 5, 2 6, 2 7, 2 8, 2 9, 1 10, 1
11, 3 12, 3 13, 3 14, 3 15, 3 16, 4 17, 4

⑪ I,SBL(I)= 1,1.00 2,1.00 3,1.00 4,1.00 5,1.00 6,1.00 7,1.00 8,1.00 9,0.90 10,0.90
11,0.95 12,0.20 13,0.95 14,0.20 15,0.95 16,0.95 17,0.20

Figure 103. PLNTPLAN Print Option 9: BASFILE Input (Part 1 of 3)

HEADING	LABEL	DESCRIPTION
①	IHDATE	Date that BASFILE was created
	IDENTO	Run identification number for BASFILE creation
	ISIDE	Side for which plan was made
	NCORR	Number of corridors
	NGROUP	Number of weapon groups
	NPAYLOAD	Number of payload type
	NASMTYPE	Number of ASM types
	NTANKBAS	Number of tanker bases
②	INITSTRK	Indicator for first or second strike
	CORBOMB	Coordination distance parameter for bombers (distance from corridor entry, in nautical miles, at time = 0)
④	ASM TABLE	ASM information table
⑤	IWHDASM	Warhead index for ASM
	RANGEASM	Range of ASM
	RELASM	Reliability of ASM
	CEPASM	CEP of ASM
	SPEEDASM	Speed of ASM
⑥	PAYLOAD TABLE	Payload information table
⑦	NOBOMB1	Number of type 1 bombs
	IWHD1	Type 1 warhead index
	NOBOMB2	Number of type 2 bombs
	IWHD2	Type 2 warhead index
	NASM	Number of ASMs
	IASM	ASM index
	XDEG	Degradation factor for missiles - entry for bombers is not meaningful
	NCM	Number of countermeasures for bombers - entry for missiles is not meaningful
	NDECOYS	Number of terminal decoys
	NADECOYS	Number of area decoys
	PAYALT	Weapon release altitude mode

Figure 103. (Part 2 of 3)

HEADING	LABEL	DESCRIPTION
8	I, REL(I)	I = weapon type REL(I) = reliability of weapon type I
9	I, IHWTYPE(I)	I = weapon type IHWTYPE = type name for weapon type I
10	I,PGTYPE(I)	I = weapon group number PGTYPE(I) = type index for weapon group I
11	I, SBL(I)	I = weapon group number SBL(I) = survival-before-launch probability for weapon group I

Figure 103. (Part 3 of 3)

```
                PRINT NUMBER  11
                                          ADJUST
 1              UNADJUSTED PLAN
       2
       I    3 ALAT(I)   4 ALON(I)   5 DISTANCE,I TO I+1

       1      36.000     236.000              0.000
       2      36.000     236.000            428.987
       3      39.920     243.590            133.777
       4      40.425     240.748             77.603
       5      40.720     239.090            583.573
        6 GOLOW2= 428.987  GOLOW3= 794.855  MHT=    4

 7     8        ADJUSTED PLAN
       I    9 ALAT(I)  10 ALON(I)  11 DISTANCE,I TO I+1

       1      36.000     236.000              0.000
       2      36.433     236.759            428.987
       3      39.920     243.590            133.777
       4      40.425     240.748             77.603
       5      40.720     239.090            583.573

12 ISTCREHI=    5  ISTORELO=    1  IGOLEFT=  0FACHI=583.474  FACLO=  0.000  GOLO= -0.099MHT=   4
```

Figure 104. PLNTPLAN Print Option 11: ADJUST Snap (Part 1 of 2)

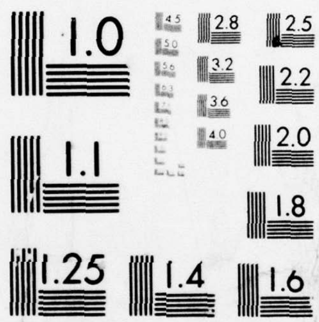
HEADING	LABEL	DESCRIPTION
1	UNADJUSTED PLAN	Contents of the following variables before execution of subroutine ADJUST
2	I	Index to /ASMARRAY/ events
3	ALAT(I)	Latitude of Ith event
4	ALON(I)	Longitude of Ith event
5	DISTANCE, ItoI+1	Contents of DISTC(I); the distance between the Ith and and (I+1)st event
6	GOLOW2	Low-altitude range before first target
	GOLOW3	Low-altitude range after first target
	MHT	Total number of lines currently in the detailed plan of /DINDATA/
7	ADJUSTED PLAN	Contents of the following variables after execution of subroutine ADJUST
8 - 11	---	Same as 2 - 5
12	ISTOREHI	Event number in /OUTSRT/ after which GO HIGH occurs
	ISTORELO	Event number in /OUTSRT/ after which GO LOW occurs
	IGOLEFT	Set to 1 if low-altitude range is available after depenetration
	FACHI	Distance after event ISTOREHI at which GO HIGH is located
	FACLO	Distance after event ISTORELO at which GO LOW is located
	GOLO	Amount of low-altitude range remaining for depenetration
	MHT	Total number of lines currently in the detailed plan of /DINDATA/

Figure 104. (Part 2 of 2)

AD-A052 058 SYSTEM SCIENCES INC BETHESDA MD F/G 15/7
THE CCTC QUICK-REACTING GENERAL WAR GAMING SYSTEM (QUICK). USER--ETC(U)
JUN 74 R L PAGE, A M PELLICCIOTTO DCA100-73-C-0058
UNCLASSIFIED CCTC-CSM-UM-9-74-VOL-4-CH- NL

2 OF 2
AD
A052 058

END
DATE
FILMED
5-78
DDC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
                PRINT NUMBER  13
                                      TIMING INFORMATION
①  1 0.8801    2 0.0000    3 0.0080    4 0.0000    5 0.0000    6 0.0000    7 0.0000    8 0.0000    9 0.0000   10 0.0000
②    0.8801      0.0000      0.8202      0.0000      0.0000      0.0000      0.0000      0.0000      0.0000      0.0000
   ACTIVE TIME =     1.7002 MIN.     LOST TIME =      0.4057 MIN.     ELAPSED TIME =     2.1059 MIN.
③
```

This print is issued through utility subroutine TIMEME, a description of which can be found in Volume I of CSM PSM 9A-67. The time intervals accumulated for PLNTPLAN are:

① Differential times and

② Cumulative times for the following sections of PLNTPLAN execution:

- Cell 1: Program initialization
- Cell 2: Missile processing
- Cell 3: Bomber processing
- Cell 4: Tanker processing
- Cell 5: Program termination
- Cells 6 through 10: Unused

③ ACTIVE TIME = Sum of cumulative times in cells 1 through 5

LOST TIME = Printing time, not included in ACTIVE TIME

ELAPSED TIME = ACTIVE TIME + LOST TIME

Figure 106. PLNTPLAN Print 13 (TIMEME Information)

4.4.4.15 PLNTPLAN Error Messages. PLNTPLAN error messages are shown in figure 107.

1. Deleted

2. *****GROUP XXX CORRIDOR XXX SORTIE XXX IS A NULL SORTIE
SORTIE SEQUENCE i ************
No weapons are indicated in bomber input plan. The plan is ignored, and the next plan is read from STRKFILE.

3. GROUP xxx CORRIDOR xxx SORTIE xxx HAS TOO MANY TARGETS **
NHAP = xxx
More than 10 events are indicated in the bomber input plan. The plan is ignored, and the next plan is read from STRKFILE. Examine plan (OUTSRT) from program POSTALOC.

4. Deleted

5. ***** INSUFFICIENT TANKER RANGE *************
NEW REFUEL POINT CALCULATED
BASE AT _____ ENTRY AT _____ BUDDY REFUEL AT _____ CLOSEST TANKER BASE AT _____ NEW REFUEL POINT AT _____
The buddy refuel point calculated for a bomber is not within range of any tanker base. A new refuel point is calculated by interpolation such that it will be within range of nearest tanker base. This does not indicate an error.

6. Deleted

7. Deleted

8. NEGATIVE GOLOW2 EXTENDS TO END OF SORTIE
Input go-low information is wrong. Further processing of the plan is halted, and the next plan is read. Examine plan (OUTSRT) from program POSTALOC.

Figure 107. PLNTPLAN Error Messages (Part 1 of 3)

APPENDIX

EXECUTABLE JOB CONTROL LANGUAGE (JCL)

SORTIE GENERATION SUBSYSTEM

This appendix details the executable JCL which is required to run the programs of the Sortie Generation subsystem on the CCTC HIS 6080 hardware/software system.

The executable JCL is presented in subsequent figures on a program-by-program basis, i.e.:

Figure No.	Program
147	FOOTPRNT
148	POSTALOC
149	PLANOUT
151	PLOTIT

```
$       IDENT    5162,XFOOT,225,JOE SMITH ,634,17
$       USERID   634PB225$PASSWORD/TTT
$       PROGRAM  FOOTPRNT,DUMP                EXECUTE FOOTPRNT
$       LIMITS   05,60K,,20K
$       PRMFL    **,R,R,634PB225/QUICK/PLIB/FOOTPRNT
$       PRMFL    H*,R,R,634PB225/QUICK/PLIB/FOOTPRNT
$       FFILE    P*,LGU/(06,3 ,42,43)         OUTPUT TO 'P*'
$       FILE     02,F02S,100L                 ALOC GROUP FILE
$       FILE     03,F03S                      TMPALOC FILE
$       FILE     08,F08S                      BASE FILE
$       FILE     25,X25R,100L                 SCRATCH
$       FILE     26,X26R,100L                 SCRATCH
$       FILE     30,F30S                      FILE HANDLER DIRECTORY
$       DATA     I*
$       ENDJOB
***EOF
```

Figure 147. Program FOOTPRNT JCL

```
$        IDENT    5162,XPLOT,225,JOE SMITH ,634,17
$        USERID   634PB225$PASSWORD/TTT
$        PARAM
$        PROGRAM  PLOTIT,DUMP
$        LIMITS   15,25K,,25K
$        PRMFL    **,R,R,634PB225/QUICK/PLIB/PLOTIT
$        FFILE    P*,LGU/(06,39,42,43)
$        TAPE9    01,X01D,,#1     PLANTAPE
$        TAPE7    02,X02D,,#2     PLOT TAPE
$        FFILE    02,NLABEL
$        TAPE9    03,X03D         PIECETAPE
$        DATA     I*
$        ENDJOB
***EOF
```

A047210
256

Figure 151. Program PLOTIT JCL